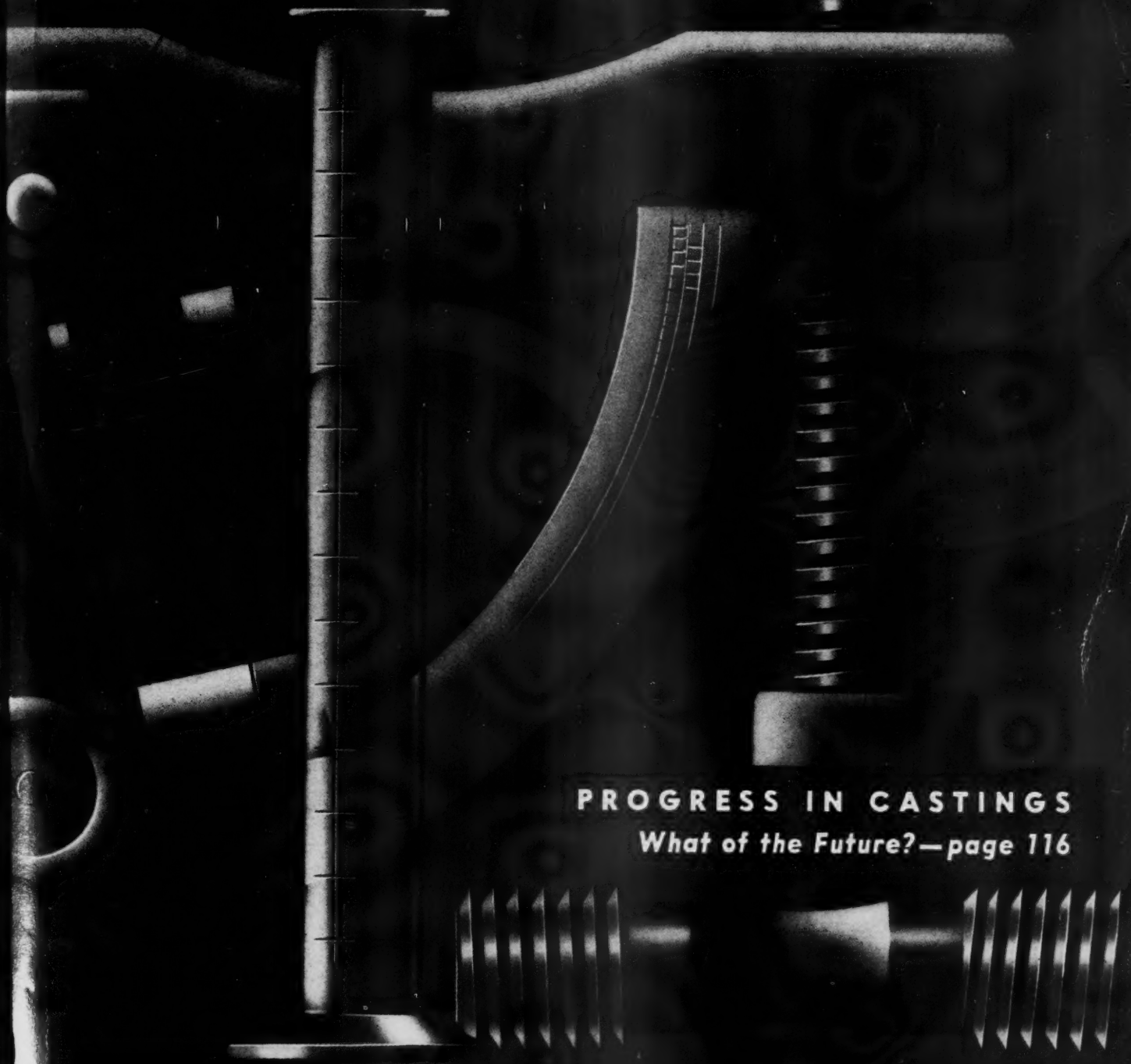
MAY 1953

FOUNDRY

WHEREVER METALS ARE CAST



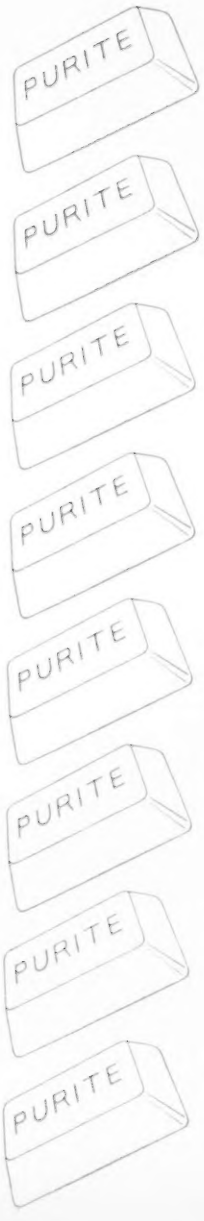
PROGRESS IN CASTINGS

What of the Future?—page 116

ANNUAL AFS CONVENTION, CHICAGO, MAY 4-8*—page 150*

THE PIONEER . . . AND STILL THE LEADER

Purite, the scientific flux for better melting and cleaner iron, is sold by leading foundry supply houses in the United States and Canada.



1. Purite produces a higher percentage of finished castings per ton of metal poured.
2. Purite gives 100% fluxing action in the cupola—100% desulphurizing action in the ladle.
3. Purite gets to all the iron quicker.
4. Purite is time-tested and proved for unsurpassed desulphurizing uniformity.
5. Purite comes in 2-lb. pigs and 2-oz. tablets—no weighing or measuring required.
6. Purite is 100% pure fused soda ash—you do not pay for inert materials.
7. Purite does not crumble—no waste—no dust.
8. Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.

1613

MATHIESON INDUSTRIAL CHEMICALS COMPANY

Division of Mathieson Chemical Corporation

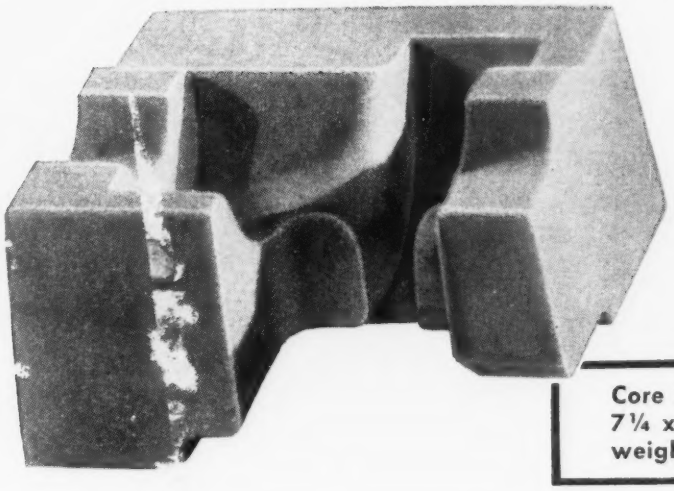
Baltimore 3, Maryland

MATHIESON

Foundromatic Dryer Dries Core in

3 Minutes...

Takes 70 Minutes in Conventional Oven



Core measures: 7¼ x 6¾ x 4, weighs 7 pounds.

WITH THE *Foundromatic* dryer you not only slash core *baking* time, but you reduce core *handling* time by eliminating:

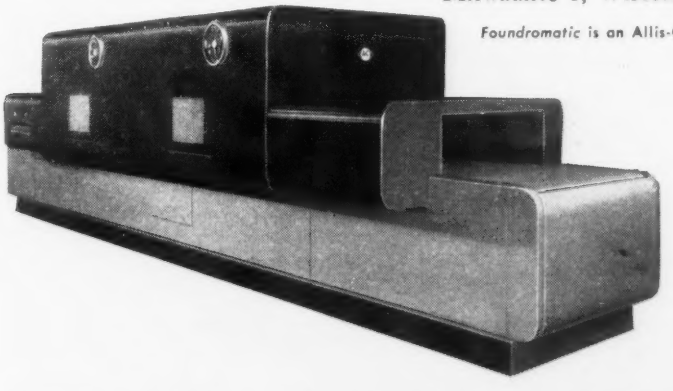
1. **Collecting Rack**
2. **Cooling Rack**
3. **Storage Rack**

Cores can go directly from the *Foundromatic* dryer to the molder. They are cool, dry, ready-to-use the moment they come out of the dryer.

In addition, these cores have excellent shakeout characteristics and a smooth finish that means better castings. Fuel costs are lower, too, because no energy passes between the electrodes when there are no cores in the oven. No overbaking either! A core left in the oven all day will not burn.

Find out more about the time- and money-saving *Foundromatic* Core Dryer by calling your nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3891

Foundromatic is an Allis-Chalmers trademark.



ALLIS-CHALMERS

FOUNDROMATIC *Dielectric* SAND CORE DRYER

QUESTIONS and ANSWERS

About Dielectric Sand Core Drying

1. *How much savings can I expect with the* Foundromatic *core dryer?*

   Estimated savings of 55% to 70% have been reported.

2. *Do I need an electronic engineer to help me?*

   No. Once equipment is installed and operating, any personnel can be quickly trained to follow operating instructions.

3. *How much maintenance is there?*

   Very little. Periodic oiling of conveyor and blower motors and rollers; and replacement of tubes.

4. *How long must we wait after cores pass through dryer before they can be used?*

   Cores can be used immediately.

5. *Does the* Foundromatic *core dryer use power when empty?*

   No. Dielectric heaters inherently deliver no power unless the material is between the electrodes.

6. *Will light sections burn if dried with heavy sections?*

   No. Cores will not burn in the *Foundromatic* core dryer.

7. *What about collapsibility?*

   Resin bonded cores have very good collapsibility, contributing to a faster, cleaner shakeout.

SEND

Allis-Chalmers A-3891
Milwaukee 1, Wisconsin

Please send me new 8-page booklet 15B7306B containing complete information on the *Foundromatic* sand core dryer.

Name .....

Title .....

Company .....

Street .....

City State

no other method of sand preparation can give you such uniform, thoroughly SATISFACTORY RESULTS!

For easier, more economical sand preparation, and better castings, use Crown Hill Seacoal, Federal Green Bond and Federal Sand Stabilizer as your sand additives.

If yours is an iron foundry and you are still searching for additives to provide the sand characteristics needed for your work—without requiring special sand or exacting sand control—you can stop searching! Do what hundreds of iron foundries do—use Seacoal, Bentonite and Sand Stabilizer.

Each of these materials has to do with distinct elements of sand preparation, so their use in varying amounts makes it possible to easily control all the important sand characteristics and to change them to satisfy specific requirements. By adding the proper amount of Seacoal, carbon content can be controlled at will and changed to suit the job. Through the use of Bentonite, green and dry strength of the sand can be varied as required. Adding Sand Stabilizer provides control of flowability, so molds can be rammed to proper hardness with a minimum of time and effort.

Special or fine grades of sand are unnecessary. Common lake, river or beach sand is often used for heap or system replacement. And there's no danger of sand grain size being thrown out of balance—as happens when offals of cores made of coarse sand, mix in with the fines necessarily used with emulsified asphalt or resin additives.

Yes, you'll get easy sand preparation—better castings—smoother casting finish—less-lumpy shakeouts with Seacoal, Bentonite and Federal Sand Stabilizer. *And these additives will cost you less than $1.00 per ton of castings produced!* A new bulletin tells all about this better method of sand preparation—write for your copy TODAY!

CROWN HILL SEACOAL

Produced by FEDERAL at Crown Hill, West Virginia. *High* in volatile combustible material, *low* in sulphur and ash content—basic requirements for a top quality seacoal. Ground or granulated to properly match the sand used.

FEDERAL GREEN BOND

Mined, processed and guaranteed by FEDERAL and unexcelled in uniformity and ability to develop green and dry strength. Truly the best of the bentonites!

FEDERAL SAND STABILIZER

A processed cellulose sand additive whose high combustibility allows sand to expand evenly to eliminate casting defects. It increases sand flowability to provide better ramming conditions and attracts moisture to broaden the safe moisture range. And it eliminates lumpy shakeout.

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND, VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON, WYO.

IN TWIN CITIES: Charles D. Gallaher, 11150 S. Old Shakopee Rd., Minneapolis 20, Minn.

FOUNDRY

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MAY 1953

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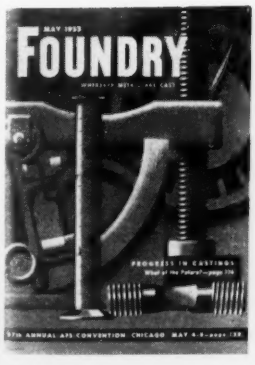
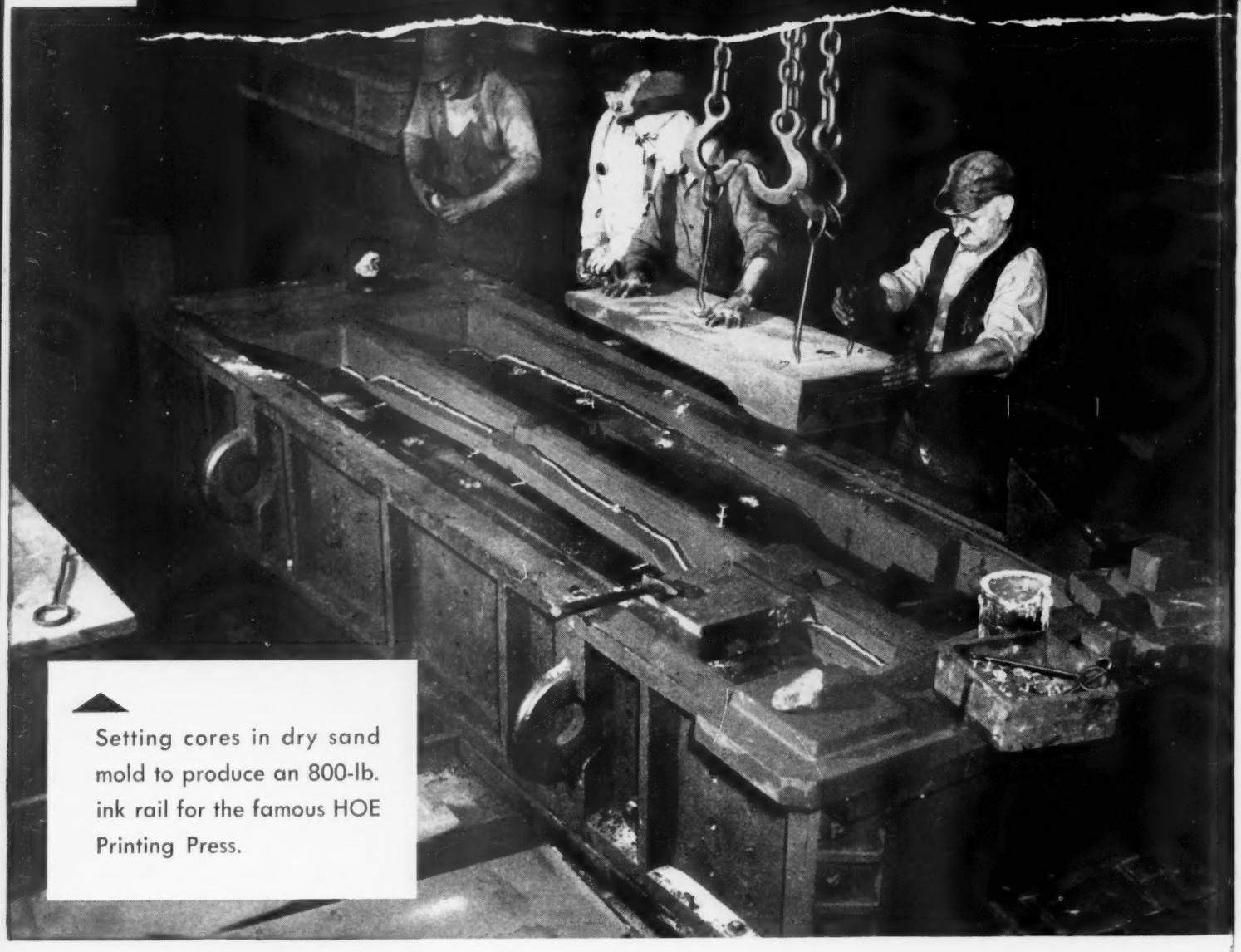


THE COVER: Several of the tools used in controlling and improving quality of castings are grouped by artist George Farnsworth

INSEPARABLE FOR O



Setting cores in dry sand mold to produce an 800-lb. ink rail for the famous HOE Printing Press.

Cores for ink rails (see above) are made ready for over-night bake at 375-400° in oil-fired batch-type oven. Sand-LINOIL ratio of 50 to 1 by volume is used.

The
R. H
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The
fool
hard
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free
upon

OVER 1/4 CENTURY

HOE

uniform

LINOIL

THE LOGICAL OIL

plays important part in production of quality cores at

R. HOE & CO., INC.

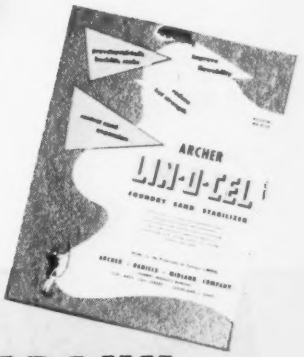
The Dunellen (N. J.) Foundry Division of R. Hoe & Co., Inc., pours semi-steel castings of all sizes for their famous high-speed printing presses. Giant machine tool bases ranging up to nine tons is also their business.

The size and cost of such work calls for fool-proof cores, unvarying in strength, hardness and collapsibility. That's why the core room foreman at Hoe has used trouble-free LINOIL for 26 years! They can depend upon its uniformity to produce consistent cores without having to vary the mixture from month to month.

Your LINOIL representative will be pleased to demonstrate LINOIL in your core room. Ask him next time he calls, or write direct to the address below for more information.

just off the press

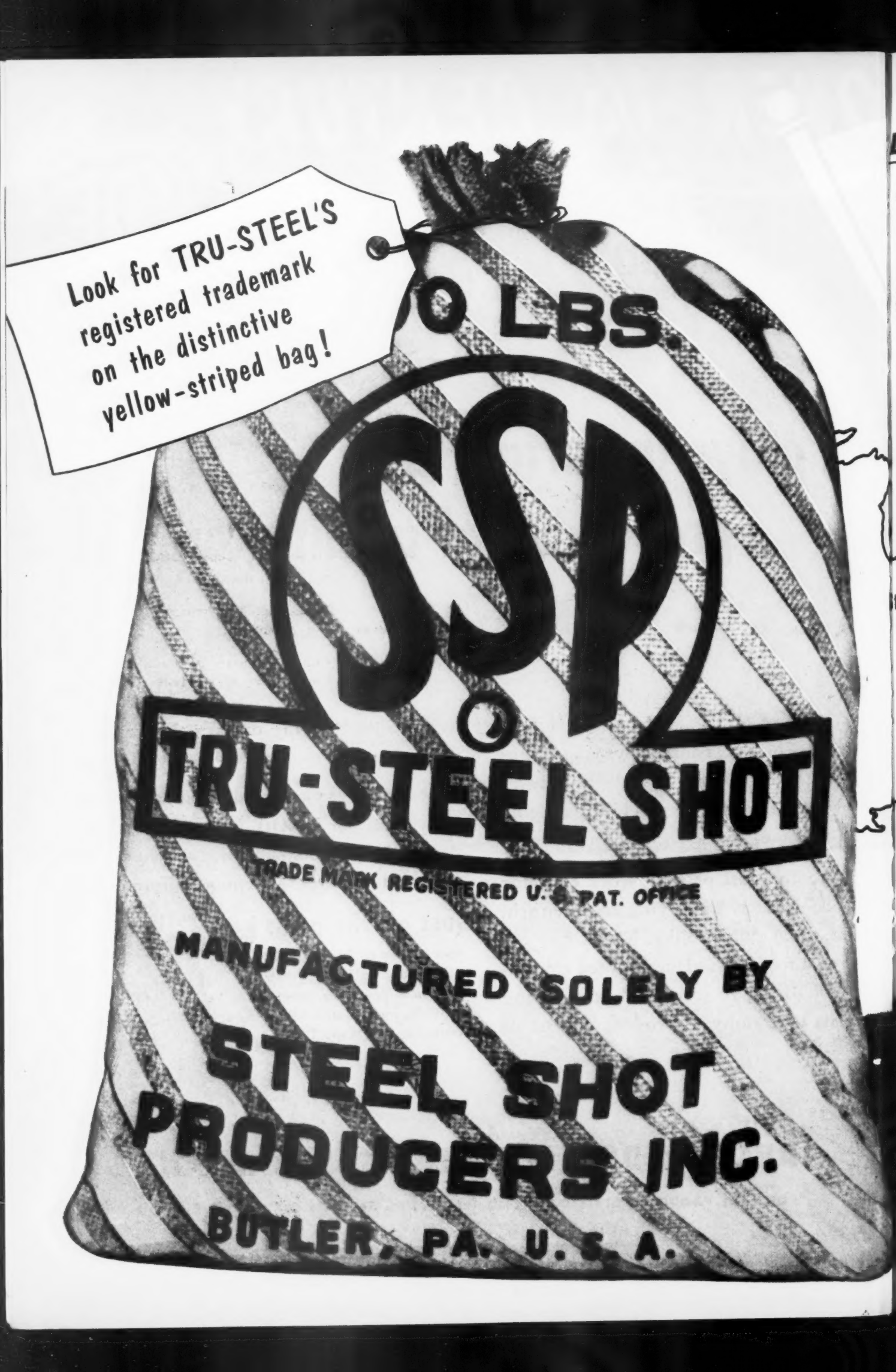
New bulletin on Archer LIN-O-CEL Sand Stabilizer tells how to improve flowability, prevent rat-tails, buckles and scabs. Write for your copy TODAY.



ARCHER·DANIELS·MIDLAND COMPANY

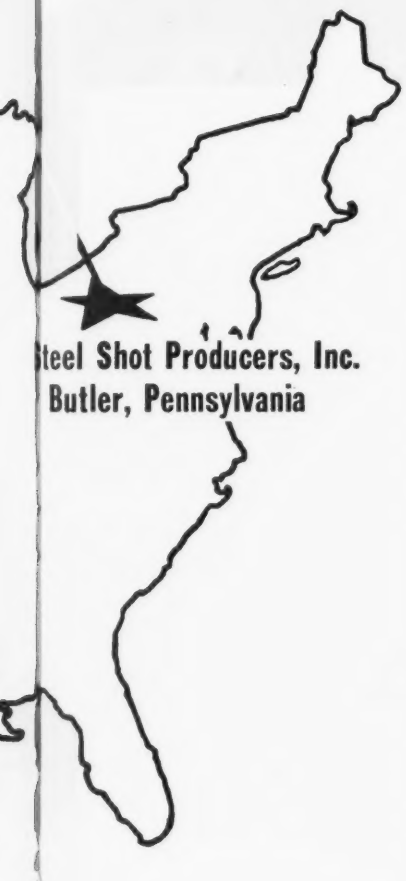
FOUNDRY PRODUCTS DIVISION • 2191 WEST 110th STREET • CLEVELAND 2, OHIO

PRODUCERS OF **LINOIL** **INDUCTOL** **FREFLO** **LIN-O-CEL**


Look for TRU-STEEL'S registered trademark on the distinctive yellow-striped bag!
LBS.
SSP
TRU-STEEL SHOT
TRADE MARK REGISTERED U. S. PAT. OFFICE
MANUFACTURED SOLELY BY
STEEL SHOT PRODUCERS INC.
BUTLER, PA. U. S. A.

Let's keep the record straight!

TRU-STEEL Shot is manufactured and shipped from only ONE plant* in America!



DON'T BE CONFUSED by new names, new brands, new products, new claims, new sales stories in the field of metal abrasives!

TRU-STEEL shot is manufactured in only ONE plant in America . . . STEEL SHOT PRODUCERS, INC., at Butler, Pennsylvania!

TRU-STEEL shot is the *original* high-carbon, heat treated steel shot of tool steel quality, service-proved by five years of actual production use.

TRU-STEEL shot was developed *solely* by STEEL SHOT PRODUCERS, part of an organization that has more than 60 years experience in manufacturing metal abrasives.

TRU-STEEL shot benefits from a continuous program of research carried on by our metallurgists in co-operation with experts of the nation's foremost metals research organization.

TRU-STEEL shot gives you *unequalled quality* because of constant supervision in daily production that maintains exacting standards of chemistry, hardness and heat treating.

Know what you're ordering. Know what you're getting. Buy the brand backed by *know-how* . . . the original, time-tested TRU-STEEL shot!

WRITE US OR PHONE Butler, Pa. — 71767; Pittsburgh, Pa. — Schenley 1-1754; Mansfield, Ohio — 41676, for deliveries of TRU-STEEL or for the name of the nearest TRU-STEEL distributor. Experienced blast cleaning engineers will gladly give you the complete story of TRU-STEEL.

Steel Shot Producers, Inc.

BUTLER, PA.

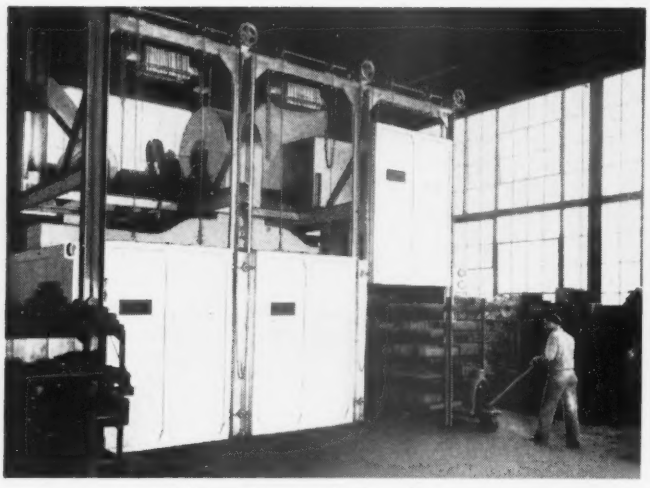
Outstanding performance of COLEMAN

Over 80% of Coleman Oven installations are repeat orders because experience has proved that these ovens provide "day in and day out" uniform baking of cores and molds at lowest cost. From their records, large production foundries and small shops throughout the country know that Coleman Ovens have increased casting production . . . reduced overhead . . . and produced greater profits.

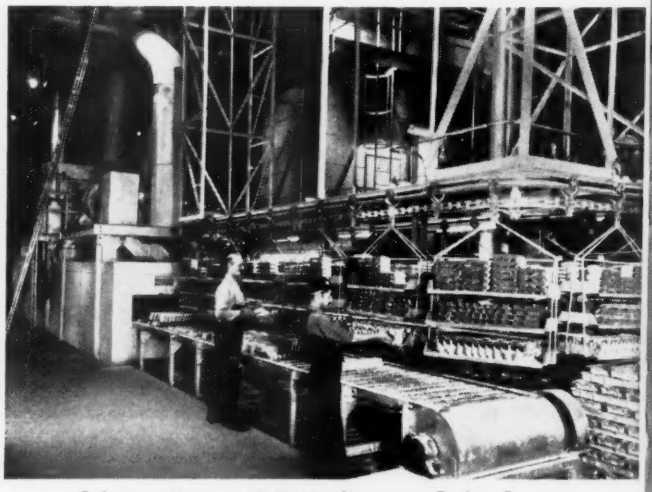
Coleman Core and Mold Ovens provide exclusive features resulting from 50 years of specialization in the design and construction of foundry ovens, and over 11,000 installations in leading foundries. As a result, Coleman Ovens give complete satisfaction on every core baking or mold drying job for which they are designed.

When you are considering a new oven installation it will pay you to consult with Coleman first. Our engineers are available, without obligation, to make practical recommendations for your particular requirements.

WRITE FOR BULLETIN C

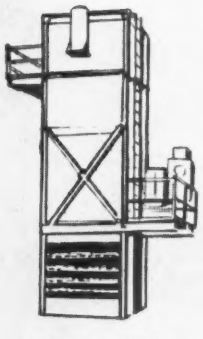


Coleman Transrack Core Ovens
at Crucible Steel Castings Company

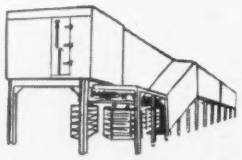


Coleman Horizontal Flight-Conveyor Redry Oven
at Ford Cleveland Foundry

A COMPLETE RANGE OF TYPES: COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement.

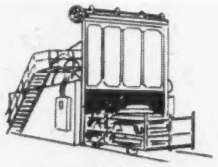


TOWER OVENS

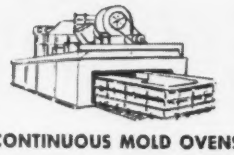


HORIZONTAL CONVEYOR OVENS

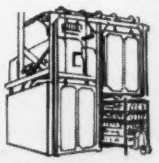
CONTINUOUS REDRY OVENS



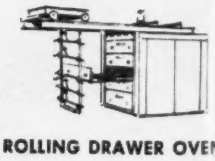
CAR-TYPE OVENS



CONTINUOUS MOLD OVENS



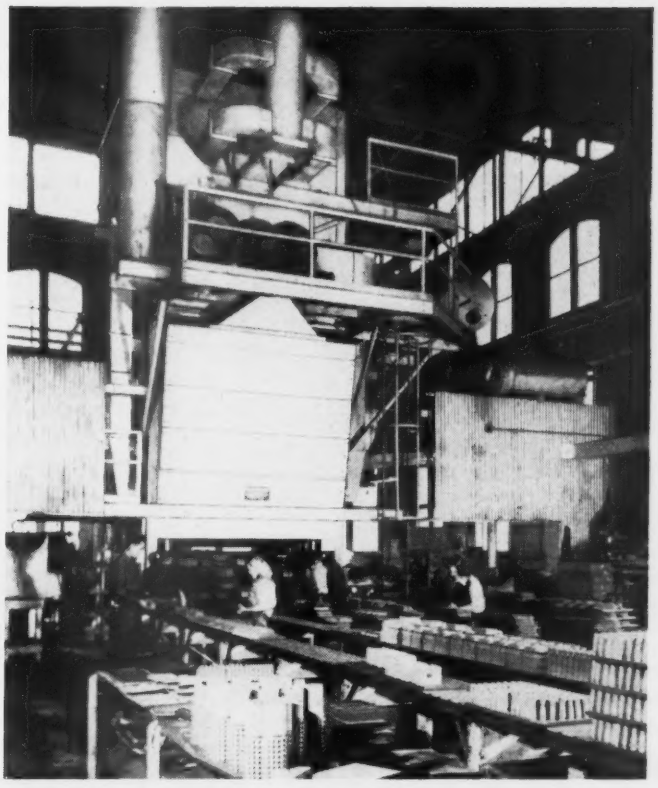
TRANSRACK OVENS



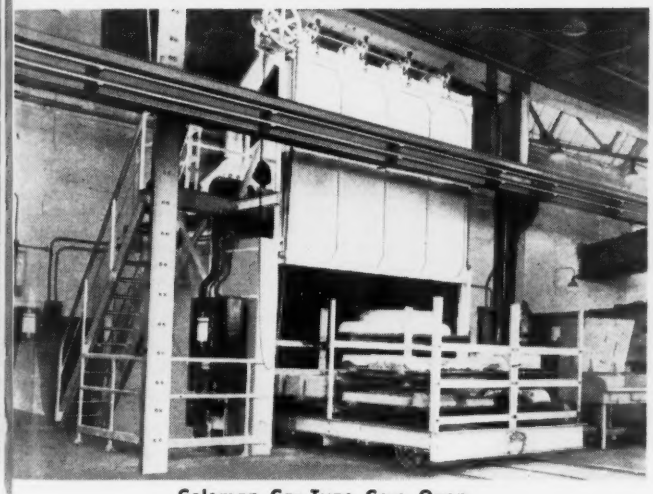
ROLLING DRAWER OVENS

OVENS

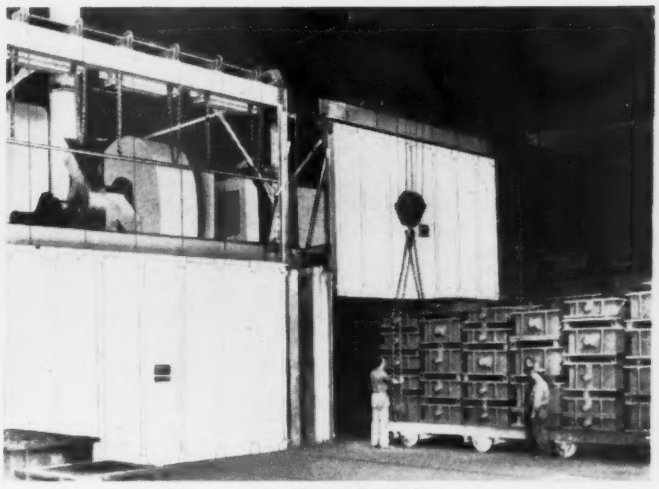
proved by repeat orders



Coleman Tower Oven
at Eastern Malleable Iron Company



Coleman Car-Type Core Oven
at Pettibone-Mulliken Corporation



Coleman Car-Type Mold Ovens
at Clark Brothers Company

Only Coleman Ovens offer all these advantages

MOST EFFICIENT HANDLING METHODS for your type of work and plant conditions . . . eliminate delays and losses.

PERFECT CORE BAKING ends manpower and casting losses due to make-overs and rejects.

PERFECT MOLD DRYING for true-to-pattern castings and easy cleaning.

INCREASED PRODUCTION by making the most efficient use of skilled and unskilled labor.

HEAVY DUTY CONSTRUCTION for continuous dependable performance, economical operation, and minimum maintenance cost.

BAKING AND DRYING TIME REDUCED regardless of size and shape of cores and molds, increasing turnover of plates, dryers, and flask equipment.

GREATEST SAVINGS IN FUEL by using the most economical fuel available.

SAVE BINDER. Proper core baking atmosphere and uniform temperature permit important savings in conventional binders.

USE HIGH SPEED CORE BINDERS. Coleman Ovens have uniform temperature and accurate control to handle temperature-sensitive resins and pre-baked oils.

THE FOUNDRY EQUIPMENT COMPANY

1831 COLUMBUS ROAD • CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

This belt ran over 2 years at 500° F.

Imperial Sahara Belts are unsurpassed for handling hot materials

On July 27, 1949 this conveyor belt was placed in service at the Reading Plant of American Chain and Cable Co., Inc. For 2 years, 3 months and 26 days it ran continuously, 24 hours a day, 5 days a week . . . handling hot shakeout with a temperature of about 500° F. During this time production was accelerated and equipment operated at top speed.

What's your belting problem?

Such service records are not unusual for Imperial's Sahara Belting. If you use belting to handle high-temperature materials, it will pay you to let our engineers submit their recommendations on new installations or replacements. Imperial Belting always costs less to use because it's engineered specifically for the job to be done.

Made of tight-woven silver hard duck, with special impregnation and insulation, *Standard Sahara* handled materials up to 300° F.; *Insulated Sahara,* up to 450° F.; *Super Insulated Sahara,* up to 600° F. Imperial's inner-locked stitching positively prevents ply separation. Write for Data Sheet 47-8 and price list.

Imperial BELTING CO.

1755 S. KILBOURN AVE., CHICAGO 23, ILL.

Engineered Belting—
The Right Belt for Each Job

With the Editors

PROGRESS in Castings: This issue featuring the coming annual convention of the American Foundrymen's Society, differs from previous preconvention issues of FOUNDRY. Since the technical program of the annual convention considers developments in the field of castings production, the editors decided to give you a preview report on what has happened during the past five years and some ideas on what may be expected in the near future. This series of six authoritative articles presented under the general heading, "Progress in Castings" starts on page 116, and continues over the next 33 pages. The editors believe this study of past, present and future progress should prove interesting and instructive and an excellent prelude to the technical sessions at Chicago.

—o—

A Big Time: While this annual convention of AFS does not include an exhibition of equipment and supplies, every indication points to a large attendance from May 4 to 8. The technical program is quite comprehensive, the special features, including the annual meeting, the Charles Edgar Hoyt annual lecture by James H. Smith, Central Foundry Division, General Motors Corp., the plant visitation program and special ladies' entertainment, look exceptionally interesting, and the chance for a trip to the Windy City is most attractive. To find detailed information on what will take place at Chicago, and who will be in charge of special features of the convention, study pages 150 to 161 inclusive.

—o—

It's Your Move: Those in charge of the Materials Handling Show which opens in Philadelphia on May 18, indicate it will be the largest industrial show to be held in 1953. Because the foundry industry is so dependent upon a wide variety of materials handling equipment, and the importance of this production tool grows constantly, many foundrymen probably will visit the show. The conference program, held in conjunction with the show, will feature five symposiums on various phases of materials handling. For these reasons readers will find information on the high lights of the 1953 Philadelphia Show and a list of exhibitors starting on page 182 of interest.

Should See This: If you missed the advertisement of General Motors, devoted to its new foundry laboratory, better look up one of the magazines carrying this prediction of bigger things to come. The two-page, four-color advertisement featuring the reproduction of a striking colored photograph of the foundry laboratory appeared in the *Saturday Evening Post* for Mar. 21; *Colliers* for Mar. 28; and *Life* for Mar. 30. And the text, which follows, seemed particularly good:

It is a far cry from the old-fashioned foundry to this block-long ultramodern experimental metals laboratory at the new General Motors Technical Center.

Here GM engineers deal primarily in "futures." Here they are able to delve ever deeper into the mysteries of metals. Find new uses for known metals—even develop alloys which are in essence "new" metals. And—in this way—reduce our country's dependence on strategic metals from abroad.

For example, our engineers have been seeking for years to produce ferrous metals more resistant to the damaging effects of corrosion and excessive heat. Their experiments in this model foundry suggested coating these metals with aluminum. So they developed a special method of dipping fabricated parts in molten aluminum which they call the "Aldip" process. And already, this gives promise of replacing alloys containing scarce and expensive metals.

Here too, our engineers are continuing their development of GM's own method of shell molding—a more efficient, precise method of casting automotive parts. Also they create materials from which to make longer-lasting, less expensive dies.

And it would be a bold man, indeed, who would dare a detailed prediction of the benefits which may yet stir in these melting pots and take form in these ovens.

Truly, this foundry is forming the industrial future.

—o—

Cast Furniture: Old fads appear to be returning. As an example, witness the recent interest in cast iron figures and furniture that, at one time, was considered an essential in any lawn decoration. We have had several communications on the statue of a deer (Reader's Comment for February, 1953, page 78 "Ain't No Such Animal," and March, 1953, page 132 "There Is Such an Animal.") As a by-product of this correspondence, we have found several firms engaged in the manufacture of cast furniture and other cast works of art. I have received a splendid catalog from Kenneth Lynch & Sons, Wilton, Conn., which illustrates many objects in iron, lead, brass and bronze. (A photograph of the plant is included in the catalog and I am sold on calling there some fine summer day.) Mr. Lynch also sent along a reprint of a beautifully illustrated article on his activities which ap-

(*Concluded on page* 12)

CRUCIBLE FURNACES melt all the metal

in this well known Eastern Foundry

Seven forced draft coke fired Crucible furnaces. No. 225 and No. 300 Crucibles are used according to quantity of metal desired.

THE PHILADELPHIA BRONZE AND BRASS CORPORATION

PRODUCER of non-ferrous castings, maintains uniform quality and meets specifications by using only Crucible melted metals.

MELTING EQUIPMENT consists of seven stationary coke fired furnaces (illustrated) each of 900 pounds capacity; three tilting Crucible furnaces (illustrated) oil fired, each 1200 pounds capacity and four stationary oil fired furnaces (not illustrated) 450 pounds capacity each.

CRUCIBLE FURNACES here, as in some 3000 other non-ferrous foundries in the United States, demonstrate their superiority in economy, flexibility and adaptability in the production of sound castings with minimum rejections.

Three tilting Crucible furnaces oil fired, using No. 430 long lipped Crucibles, 1200 pounds capacity each.

No. 300 Crucibles, 900 pounds capacity, are lifted from the stationary coke fired furnaces carried directly to the molds and poured.

THESE FIRMS CAN TAKE CARE OF ALL YOUR REQUIREMENTS FOR CRUCIBLE MELTING

CRUCIBLE MANUFACTURERS ASSOCIATION

17 WILLIAM ST., NEW YORK 5, N. Y.

Ross-Tacony Crucible Co.

Vesuvius Crucible Co.

Joseph Dixon Crucible Co.

Lava Crucible-Refractories Co.

American Refractories & Crucible Corp.

Electro Refractories & Abrasives Corp.

Savings Tips from HYDRO-BLAST

Freight Charges Up? Take a Fresh Look at Sand Costs

It needs repeating—again and again and again—

- By far the largest potential savings for iron and steel foundries are in the rich field of Sand Reclamation.

Let's come to grips with this high-grade prospect, fast and firmly:

- The Hydro-Blast system of sand reclamation can recover about 90% of your used sand—and make it in every respect *equal to or better than* the parent sand.

That means 90% less used sand to throw away, 90% less new sand to pay for, 90% reduction in sand-freight bills. Nice money!

Maybe you're a Hydro-Blast prospect, and maybe you are not; but this we say with assurance—it's mighty easy to find out, at no cost.

Let's talk about it.

Here's MODERN Castings Cleaning in Action . . . at the F. M. Foundry

75 tons of castings cleaned at once—and that means CLEANED:

- 3 75-gpm nozzles directed from outside the enclosure
- 3 platforms for castings to be cleaned—a center table and a turn table at each end, each of 25-tons capacity

The "wash" may consist of several castings or one big 75-ton unit.

This is said to be the largest cleaning unit in the country—and possibly in the world. Worth seeing.

Benefits—

- dust practically eliminated; much better working conditions
- cleaning time greatly reduced
- inspection easier, faster
- MACHINING COSTS DOWN
- TOOLS LAST LONGER

There's a bulletin, if you want details. Write.

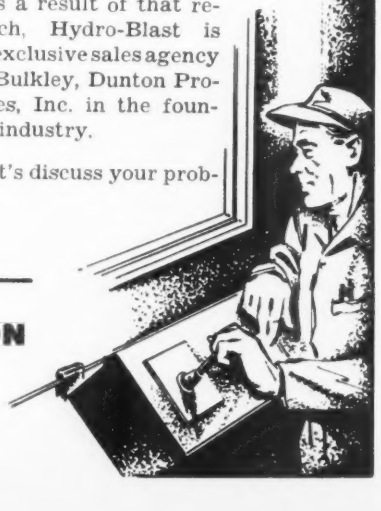
Important News—on CLARIFICATION of FOUNDRY WASTE WATER

Have you been plagued by water pollution and what to do about it? Here's a simple, prefabricated, readily-installed system that *does the job.*

Painstaking research and numerous pilot-plant tests, dating back to 1937, to find the best way to clarify waste waters, proved conclusively to us that the Colloidair Separator method of Bulkley, Dunton Processes, Inc., is the most efficient and most economical.

As a result of that research, Hydro-Blast is the exclusive sales agency for Bulkley, Dunton Processes, Inc. in the foundry industry.

Let's discuss your problem.



HYDRO-BLAST CORPORATION

2550 North Western Avenue

CHICAGO 47, ILLINOIS

(*Concluded from page* 10)

peared in the Sept. 29, 1951 issue of the *Saturday Evening Post.* One of his specialties is armor. I also have several interesting catalogs from Antique Iron Craftsmen, Birmingham, illustrating a variety of art objects in iron and aluminum castings.

By the way, a note from Florence Baker, Garden Shop, 3823 Brainerd Rd., Chattanooga, Tenn., indicates a need for sources of supply for certain patterns in cast iron furniture.

—o—

Who Could Ask More? Every two years since about the turn of the century, FOUNDRY has been gathering certain data on every foundry in the United States and Canada and publishing it in a directory entitled "Penton's Foundry List". The 1953-54 edition now is being compiled and should be ready for customers by mid-summer. The PFL department recently secured the co-operation of Western Union in collecting information on a number of companies. When this data was delivered to the Penton Building (right down by the ball park in Cleveland) we were happy to find that a number of the companies also had provided some very flattering comments on our old family journal. I looked through the list and picked out one which seems to sum up the situation very well. A company up Michigan way said:

"A consistent reader of FOUNDRY. Articles very interesting and well written. Advertising very interesting and products advertised are beneficial to us. We also purchase many products advertised."

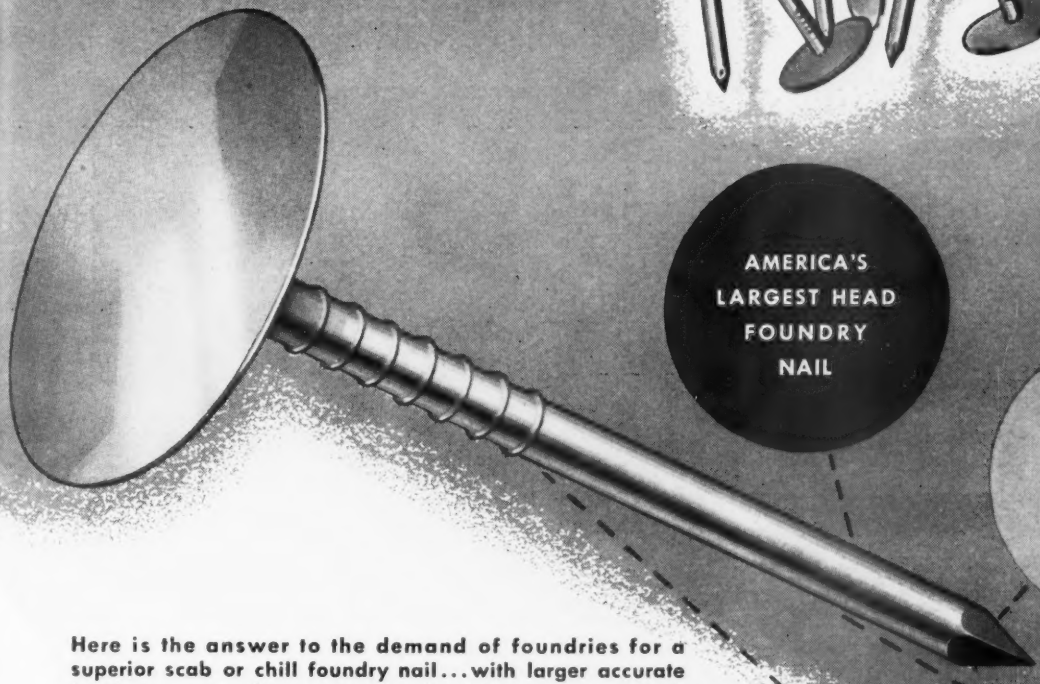
Thanks to all who took the time to comment. The editors found the day much brighter after reading your messages.

—o—

Will Be There: My, how time slips away. It certainly does not seem like a year since we were getting a breath of salt air on the boardwalk, or punishing the dogs in Atlantic City's large auditorium. Nevertheless, the time for another convention junket is at hand, and the foundry gang soon will be grabbing the rattler for Chicago. Many of the staff, both editorial and advertising, will arrive Sunday, May 3, and will be found at the Palmer House. Editors covering the convention activities will include the following: Frank Steinebach, Bill Gude, Ed Bremer, Pat Dwyer, Bob Herrmann, Jack Miske, Erle Ross, Virginia Taylor and Virginia Harms. Columnist Ralph Lee also will be there to lend a hand with reporting the convention activi-

If you find time, look us up at the Palmer House. F.G.S.

NOW! fine FANNER bullhead FOUNDRY NAILS



AMERICA'S LARGEST HEAD FOUNDRY NAIL

BURRLESS DIAMOND POINT for easy, fast handling

MADE BY PATENTED NEW PROCESS

SAVES TIME AND EQUIPMENT
•
One FANNER nail equals two ordinary nails

Here is the answer to the demand of foundries for a superior scab or chill foundry nail... with larger accurate head size... sturdier construction for better support... and burrless diamond point that saves handling time.

Foundrymen everywhere for years have asked that FANNER produce a better foundry nail—and the new FANNER "Bullhead" nail is the result of specialized experience, new and exclusive machinery, and months of testing. One FANNER "Bullhead" Nail will do the work of two or three ordinary types. They are clean... smooth... strong, easy to pick up and use. Only FANNER could produce a nail that is so exactly suited for many foundry applications. Get FANNER "Bullhead" Nails... compare the difference in quality... and they cost less than similar types.

Available in two types—order them through your foundry supply jobber or write direct.

BULLHEAD FOUNDRY NAILS

SIZES	10 gauge—⅝" HEAD			11 gauge—9/16" HEAD			12 gauge—7/16" HEAD		
LENGTH	¾"	⅞"	1"	1¼"	1½"	1¾"	2"	2½"	3"

LARGE HEAD NAILS

SIZES	9 gauge—½" HEAD				10 gauge—½" HEAD				11 gauge—7/16" HEAD			
LENGTH	⅞"	1"	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	4"	5"	6"

THE FANNER MANUFACTURING COMPANY

BROOKSIDE PARK — CLEVELAND 9, OHIO

designers and manufacturers of fine **FANNER CHAPLETS AND CHILLS**

Can you beat this for low maintenance?

Neenah Foundry Company of Neenah, Wisconsin, has been using three Cleco Edge Grinders for an average of two years. These tools are used almost continuously for sixteen hours per day, cutting flash from castings.

Recently, all three grinders were given a routine overhaul. For two of the tools, this was the first repair of any kind. The other grinder had previously required one minimum repair job.

Considering the severe usage, both Neenah Foundry Company and our distributor, The General Rubber Company of Milwaukee, feel that the service given by these grinders is outstanding.

Service like this is an important reason why Cleco Air Tools are preferred by foundries. Ask your distributor or write us for full information.

CLECO AIR TOOLS

CLECO DIVISION

PNEUMATIC DALEY EQUIPMENT AND ACCESSORIES

of the REED ROLLER BIT COMPANY, 5125 Clinton Drive, Houston 20, Texas, U.S.A.

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CALIFORNIA: Los Angeles, 1317 Esperanza St. • **GEORGIA:** Atlanta 3, 502 Peters Building • **ILLINOIS:** Chicago, 5701 West Madison St.
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In Canada: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Toronto (Leaside), Ontario
DISTRIBUTORS IN PRINCIPAL CITIES OF THE UNITED STATES AND THROUGHOUT THE WORLD

3950

HELPED US CUT OVER-ALL COSTS BY 10%"

That's what A. A. Baker, Plant Manager of J. A. Zurn Mfg. Co., reports about the *shell-cast* drain heads produced for his firm by TruCast Company, Newark, N. J. Shell molds made with General Electric shell resin were used to cast the nickel-bronze heads. This process reduced the over-all production cost of the piece by 10% because of reduced machining. As Mr. Baker says:

"Because of the excellent dimensional stability of the castings, four lathe operations, including a thread-cutting operation, were eliminated. This permitted a further elimination of some of the lathe-locating bosses. In addition, the smooth surface of the shell castings, free of hard skin, made machining and polishing much easier."

Ask G.E. about shell casting!

Shell casting is rapidly increasing in popularity because it helps you and your customers save money! Smooth surface finish, excellent dimensional stability and greater yield per man-hour are among its advantages over conventional sand-casting methods.

General Electric offers you a "team" of products to help you get maximum benefits from shell casting. *S-1054 phenolic shell resin* helps you make strong, dimensionally accurate sand shells with smooth surfaces and sharp contours. *SM-55 silicone parting agent* helps you obtain quick, easy release of shells from patterns. *Send the coupon today for free samples and technical data!*

You can put your confidence in—

GENERAL ELECTRIC

Send coupon today for more details!

General Electric Company
Section 317-3A, Chemical Division
Pittsfield, Massachusetts

Please send me:

- ☐ Brochure on G-E Shell Resins
- ☐ Sample of S-1054 Phenolic Shell Resin
- ☐ Data on SM-55 Silicone Parting Agent
- ☐ Sample of SM-55 Silicone Parting Agent

Please have a representative call ☐

Name_____

Firm_____

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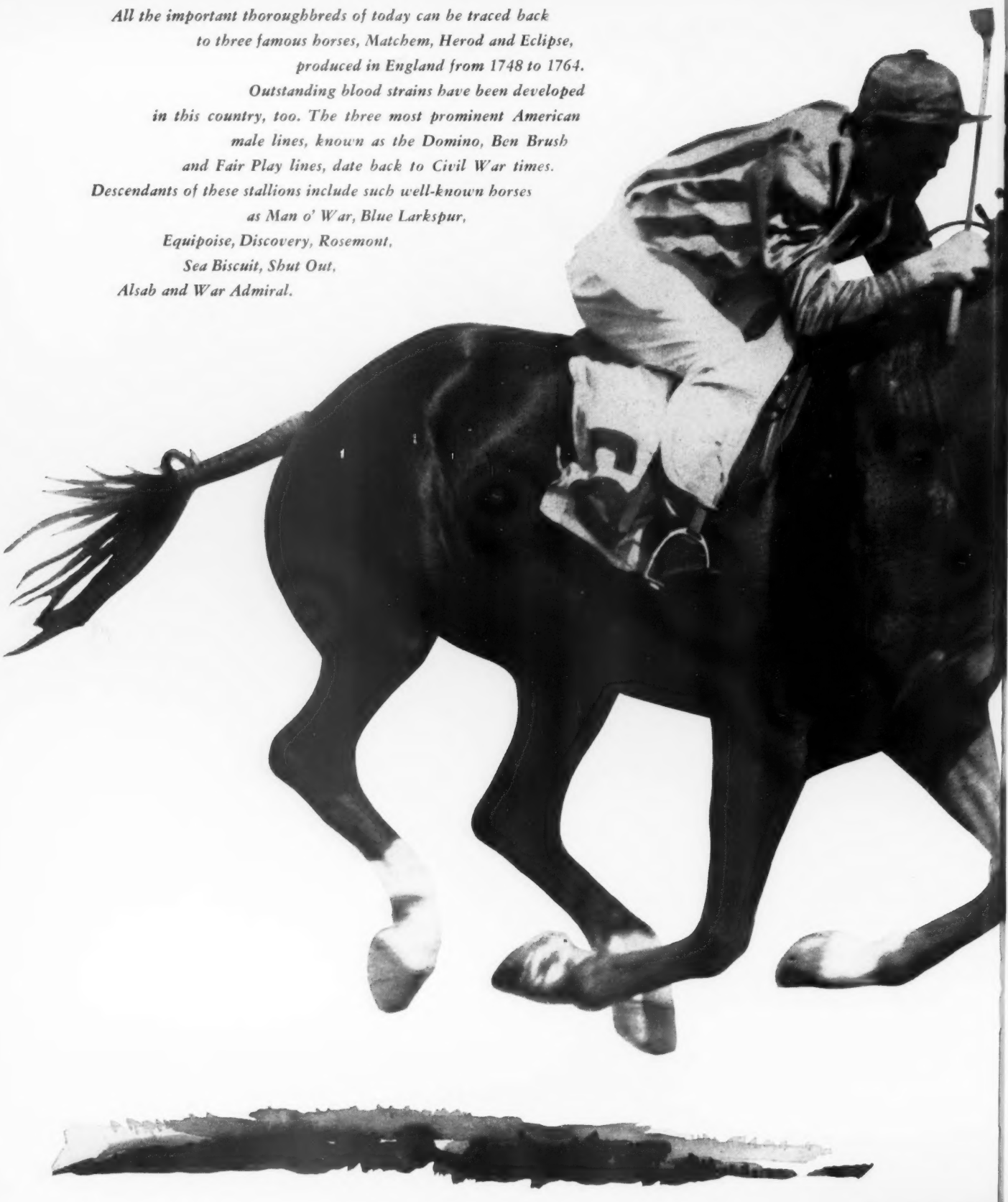
All the important thoroughbreds of today can be traced back to three famous horses, Matchem, Herod and Eclipse, produced in England from 1748 to 1764. Outstanding blood strains have been developed in this country, too. The three most prominent American male lines, known as the Domino, Ben Brush and Fair Play lines, date back to Civil War times. Descendants of these stallions include such well-known horses as Man o' War, Blue Larkspur, Equipoise, Discovery, Rosemont, Sea Biscuit, Shut Out, Alsab and War Admiral.

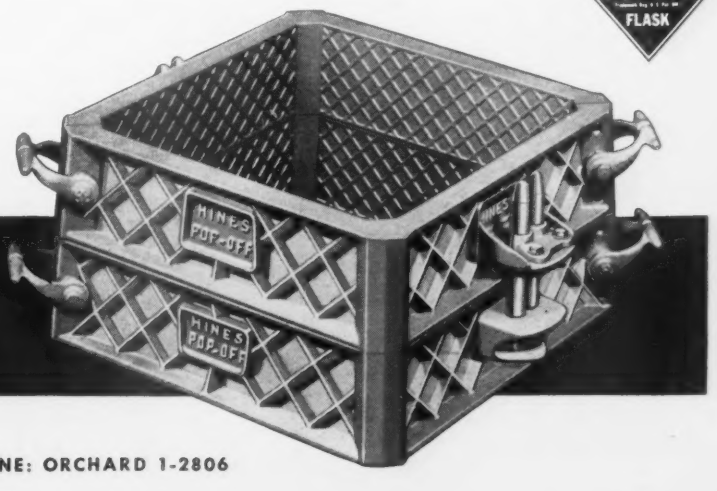


Quality

If there is one animal that denotes *quality,* it's the thoroughbred horse. His beautiful, intelligent head and splendid conformation are unmistakable evidence of royal breeding. He is the matchless embodiment of speed, stamina and courage.

Among foundrymen, HINES FLASKS are synonymous with *quality.* The way they're made and the way they perform puts them out in front of all others—stamps them as true thoroughbreds. If you want flasks of matchless *quality*—choose HINES FLASKS, every time. You can be sure they'll give you better service and longer life than any flasks you've ever used.

HINES POP-OFF FLASK



HINES FLASKS

THE HINES FLASK CO.,

3431 WEST 140TH STREET, CLEVELAND 11, OHIO • TELEPHONE: ORCHARD 1-2806

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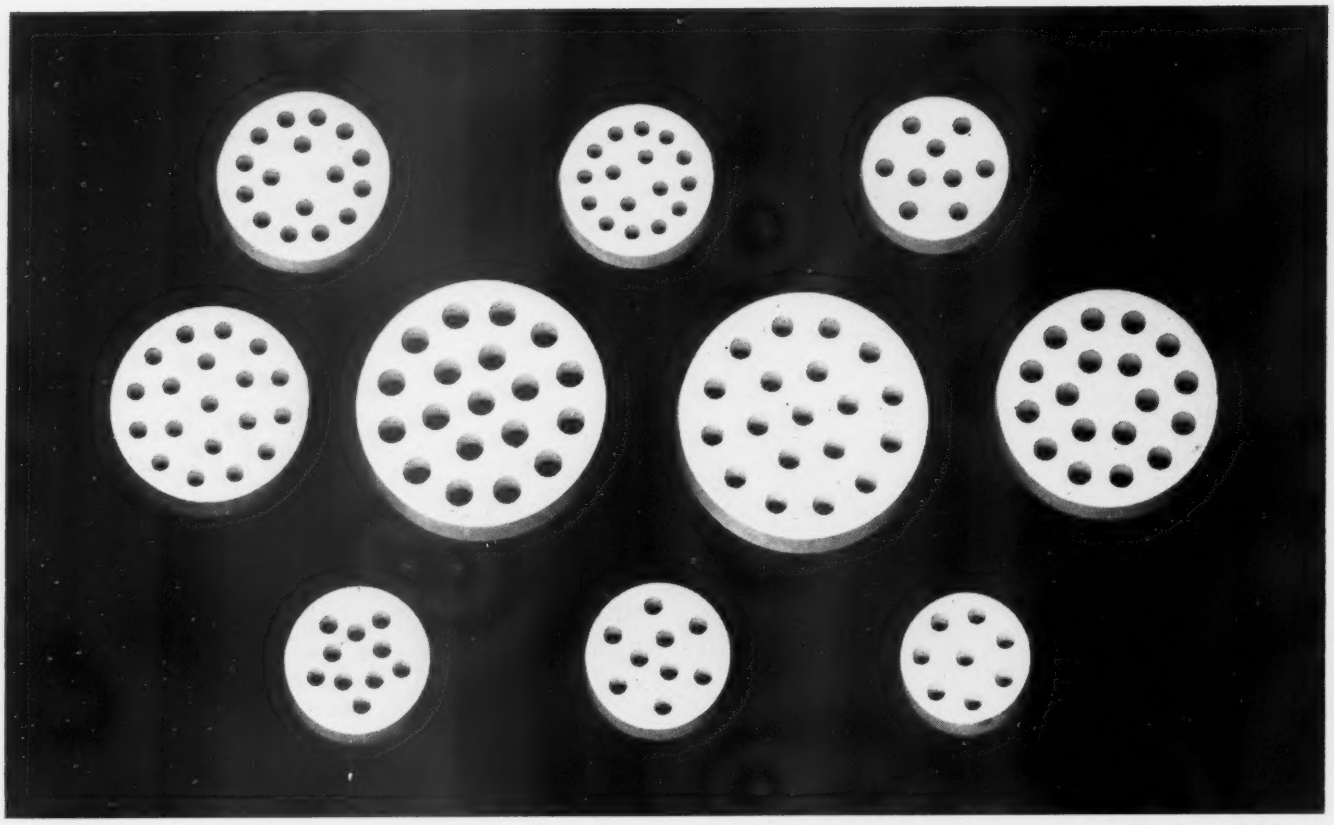
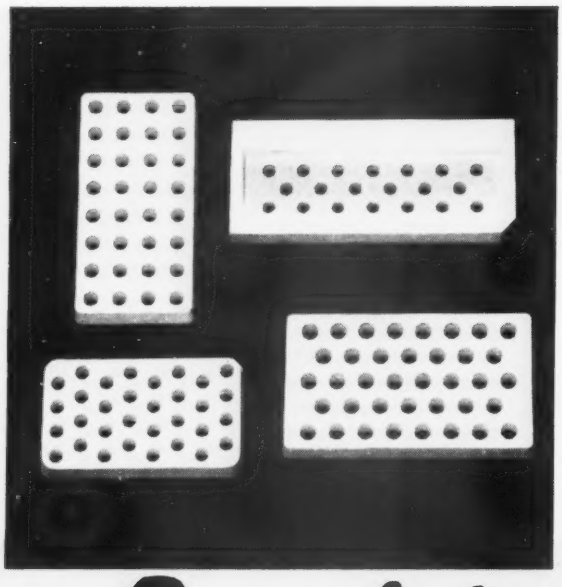


Regular stock sizes shown above—immediately available.

Positive METAL FLOW

...made possible with

PP INC. CERAMIC STRAINER CORES



Guesswork is eliminated and casting quality improved—where Porcelain Products Ceramic Strainer Cores are used. They provide a *positive* method of controlling pouring speeds. The holes in Porcelain Products extra high fusion point Ceramic Strainer Cores allow the molten metal to enter the mold at a pre-determined rate with no distortion or enlarging of pouring holes as experienced in oil bound cores through erosion and disintegration. Simply choose the strainer core that permits pouring at the rate you select, and control then becomes automatic.

There are more reasons, too, for using Porcelain Products Ceramic Strainer Cores. They turn out castings free from slag and sand inclusions—requiring less time in the cleaning room. They cut the number of rejects and reduce machining time. Porcelain Products Ceramic Strainer Cores withstand high heat, thermal shock, and can be stored indefinitely because changes in atmospheric conditions do not affect them. Available for immediate delivery in a wide variety of standard sizes. We also welcome inquiries on sizes designed to meet your special needs. Literature prints and samples available upon request.

Special sizes as shown at left produced to meet unusual specifications.

Porcelain Products, Inc.

FINDLAY, OHIO

Juniata

TRADE MARK REGISTERED

The UNIVERSAL FOUNDRY SAND

FOR SHELL PROCESS MOLDING

Juniata bank sand has the required qualities and right grain pattern for shell molding. It has taken an important place in this new field. Specially processed and screened to assure high quality.

- Highly Refractory
- Gives Sharper Profile
- Bonds Adhere Readily
- Rapid Mixing or Mulling
- Uniform Grain Distribution
- Free Flowing
- Smoother Surface
- Highly Permeable
- No Metal Penetration
- No Clay or Lime Defects

FOR INTRICATE AIRCRAFT CASTINGS

Juniata bank sands are more than proving all performance claims both for cores and molds in leading nonferrous foundries throughout the United States and Canada.

Juniata bank sands are available in either raw or artificially-dried, carefully screened form, from two separate deposits ranging from 85 to 110 A.F.A. Grain fineness.

Great Lakes

FOUNDRY SAND COMPANY—DETROIT

MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

FOUNDRY SANDS • SILICA SANDS
SHOT—GRIT—BLAST SANDS
REFRACTORIES • BENTONITE
RE-BONDING CLAYS

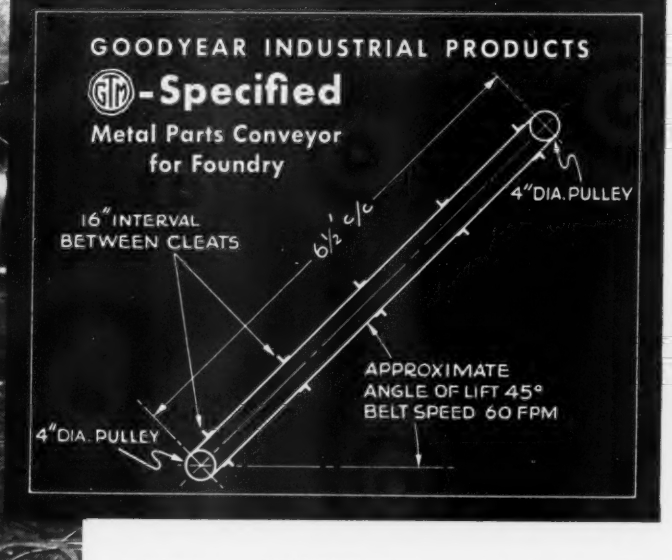
FOUNDRY REPORTS

UP TO 10 TIMES LONGER SERVICE

on conveyor belt carrying oily parts

PREVIOUS belting failed in 6 to 8 weeks carrying oily, jagged metal stampings up this 45° incline.

The G.T.M.—Goodyear Technical Man—recommended installation of an oil-resistant CHEMIGUM Conveyor Belt with bolted-on cleats. First belt installed served 16 months before replacement—10 times longer service—thanks to outstanding oil and abrasion resistance. Write: Goodyear, Industrial Products Division, Akron 16, Ohio.



Chemigum—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

How Motor Patterns Co. speeds production...saves man hours with 3 BOKOE Patternmakers Millers

ALUMINUM AIRCRAFT DRAG WHEEL PATTERN. Milling a circular radius to ± .001". Note deep throat of machine and large worktable.

in the words of
FRANK J. OKLESSEN,
General Manager, The Motor Patterns Company, Cleveland

"With the variable speed changer, we don't have to stop the Bokoe mill in the middle of a cutting operation.

The length of table travel has been a salvation to us on many jobs which formerly required two set-ups. The power-driven turntable gives us lots more working height than the usual portable turntable on ordinary millers.

We also use it as a radial drill. By turning the swivel column 180°, we can bore holes in a large, heavy casting on a skid on the floor.

The 3 Bokoe mills in our plant have enabled us to do better work faster and more accurately on aluminum and cast iron work because the machine is so versatile.

Your service on parts and cutters has been wonderful."

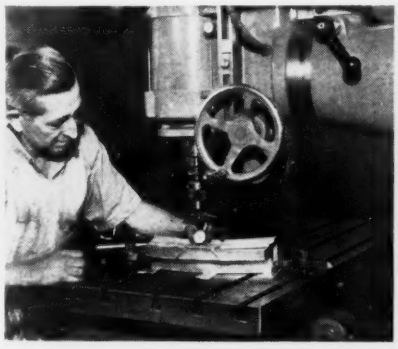
All good reasons why Motor Patterns Co. is adding another larger Bokoe Model F3 to its production line for milling steel. And its affiliate plant has also installed two Bokoe Milling Machines. Good reasons, too, why you can mill it better with a Bokoe. Write for complete details.

These leading plants use the Bokoe Miller, too

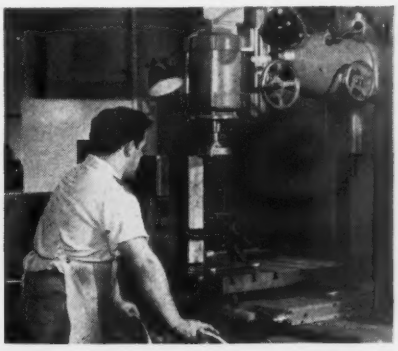
CONVAIR FORD ARROW ALUMINUM CASTINGS CO
AUTOMOTIVE PATTERN SUPERIOR PATTERN & MFG

Bokoe Universal High Speed Milling Machines are made in several models for accurate machining of patterns and models in wood, non-ferrous metals and steel.

DELIVERY FROM STOCK. ENGINEERED SERVICING AND STOCK PARTS FROM ORBAN SERVICE CENTERS IN NEWARK, DETROIT, CLEVELAND.



MACHINING CORE BOX – LOOSE PIECE. Circular radius in aluminum workpiece is milled to ± .001" with spiral cutter.



MAGNESIUM SIDE PLATE FOR CRANK CASE CORE BOX. Squaring off end of side plate to ± .001" with fly cutter at 850 RPM.

SPECIFICATIONS

Size of worktable 28" x 48"

Manual table movement—Transverse 28" longitudinal 48"

Automatic feed for transverse, longitudinal and rotary movement

Max. diameter of turntable work—8'6"

Depth of throat (between column slide and spindle center)—35"

Designed for standard U.S. voltages and frequencies; calibrations and lead screws in inches.

KO CO., INC. INDUSTRIAL IMPORTERS

KURT ORBAN COMPANY, INC.

205 East 42nd St., New York 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit 35
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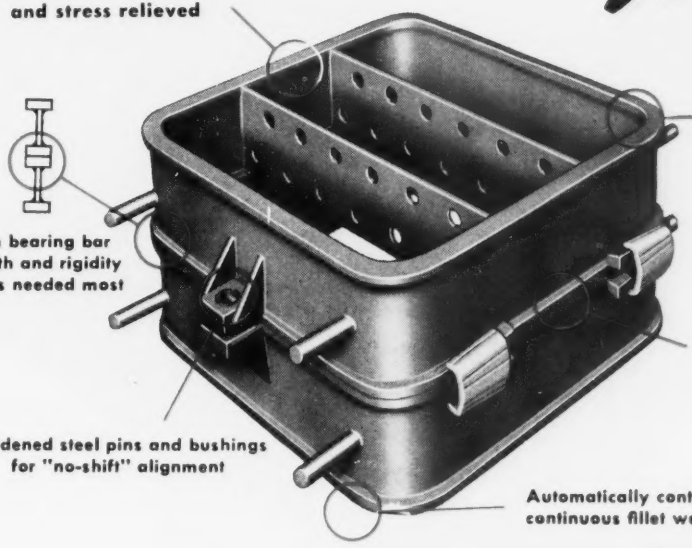
SiPi METALS CORP.
SiPi METALS CORP.
SiPi METALS CORP.
QUALITY—
always
laboratory-controlled
to meet your
exact requirements
SERVICE—
personal and helpful...
to assure you of
every possible benefit
CHECK your needs with
SiPi
PRIME PRODUCER OF ALLOYS
SiPi METALS CORP. Formerly Silverstein & Pinsof, Inc.
1720 ELSTON AVENUE • CHICAGO 22, ILLINOIS
Sales Offices in Milwaukee, Detroit, Pittsburgh, Minneapolis, Cincinnati
BRASS • BRONZE • ALUMINUM • LEAD • TIN • SOLDER • SHOT ALLOYS • ANODES • BABBITT • ZINC BASE ALLOYS • NICKEL ALLOYS

THE RIGHT CHOICE

No one type of flask can do every job efficiently. These two lines of flasks were designed for maximum performance in their type of duty. Let an Industrial representative help you make the *right choice* for your requirements.

Industrial FABRICATED


All flasks normalized and stress relieved
Bars and other components constructed to customer's individual specifications
Full width bearing bar for strength and rigidity where it is needed most
Parting line surfaces precision-machined
Hardened steel pins and bushings for "no-shift" alignment
Automatically controlled continuous fillet welded seams

PRESTEEL

Pressed steel flasks engineered for accuracy, durability and economical service.

Favorable delivery on both types of flasks.

Write for catalog or ask our representative to call.

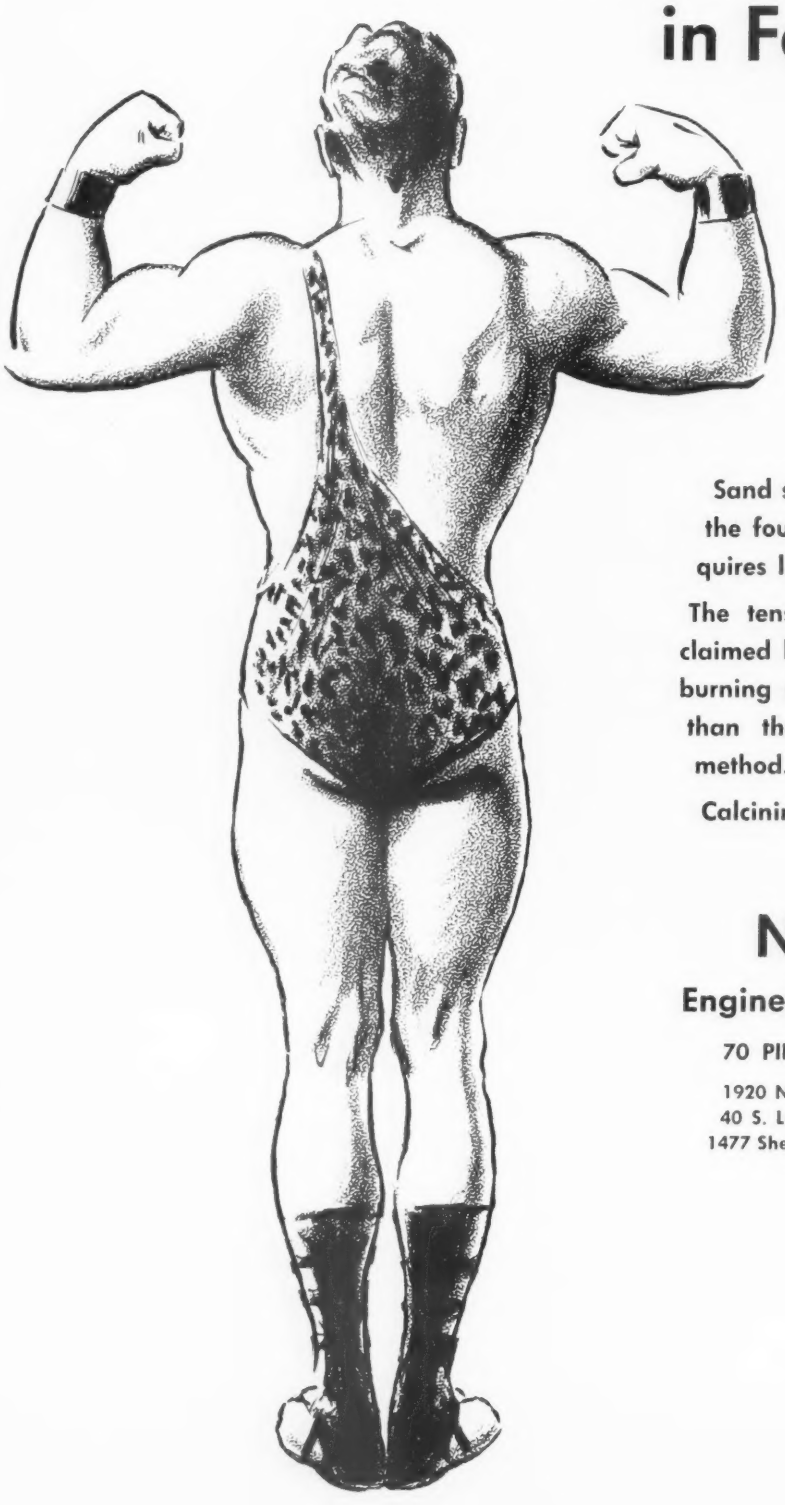
INDUSTRIAL AND FOUNDRY SALES INC.

TELEPHONE 2851

EATON RAPIDS, MICH.

STRENGTH..

..Puts the Profits in Foundry Sand



Sand strength means more profits to the foundry because strong sand requires less core oil, a definite saving.

The tensile strength of the sand reclaimed by the Nichols scrubbing and burning system is appreciably greater than that reclaimed by any other method.

Calcining produces the strongest sand.

NICHOLS

Engineering & Research Corp.

70 PINE ST., NEW YORK 5, N. Y.

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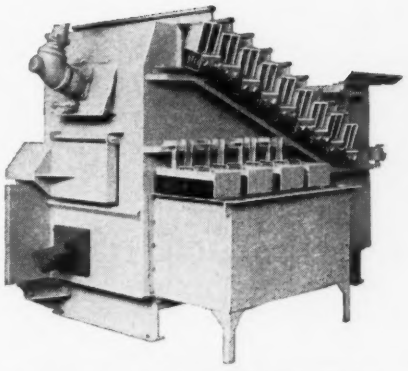
40 S. Los Robles Ave., Pasadena 1, Calif.
1477 Sherbrooke St. W., Montreal 25, Canada

NICHOLS SAND RECLAMATION SYSTEMS

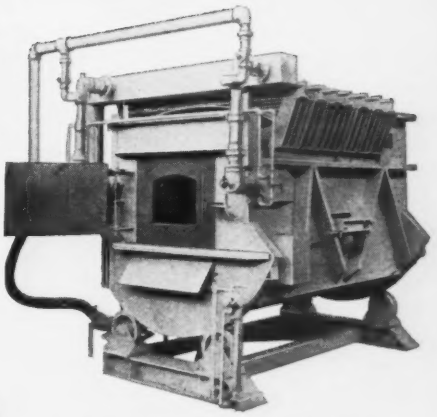
ALUMINUM

These Stroman Built Furnaces are designed for production of unsurpassed quality metal in the fastest, most efficient and economical manner. Built for all purposes and capacities they meet the demands of the sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry and reduce costs and make working conditions most agreeable. All furnaces may be fired by oil or gas.



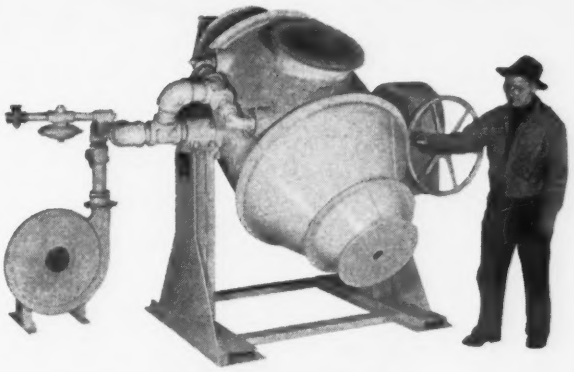
MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds aluminum.



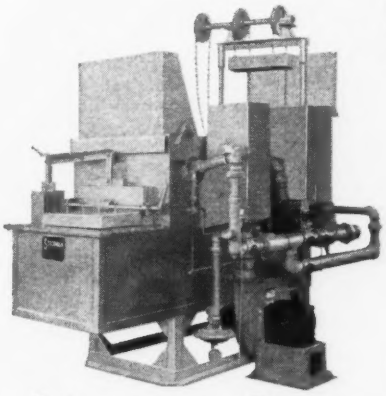
MODEL "SW"—TILTING TYPE

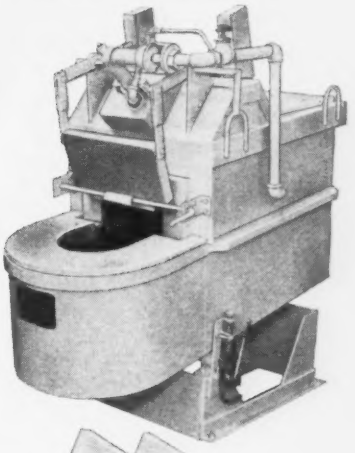
Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

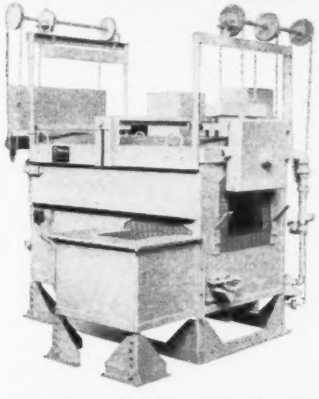


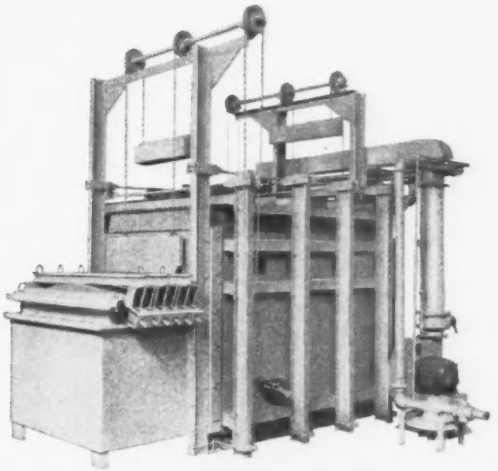
MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.



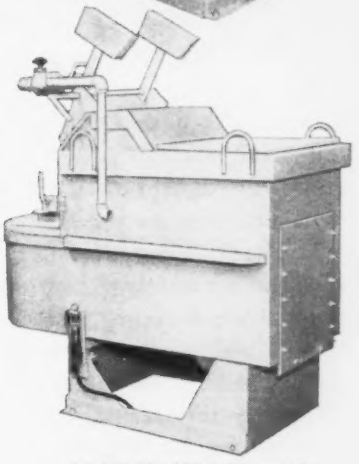






SMELTERS FURNACE

Built especially for smelters and other large melters. Easy charging, drossing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DSC" DIE CASTING FURNACE

A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.

MODEL "DC" FURNACE

The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

STROMAN ALSO BUILDS FURNACES FOR THE MELTING OF BRASS, BRONZE, MAGNESIUM, IRON, ETC., ALSO CORE OVENS. WRITE TODAY FOR NEW CATALOGUE NO. 800.

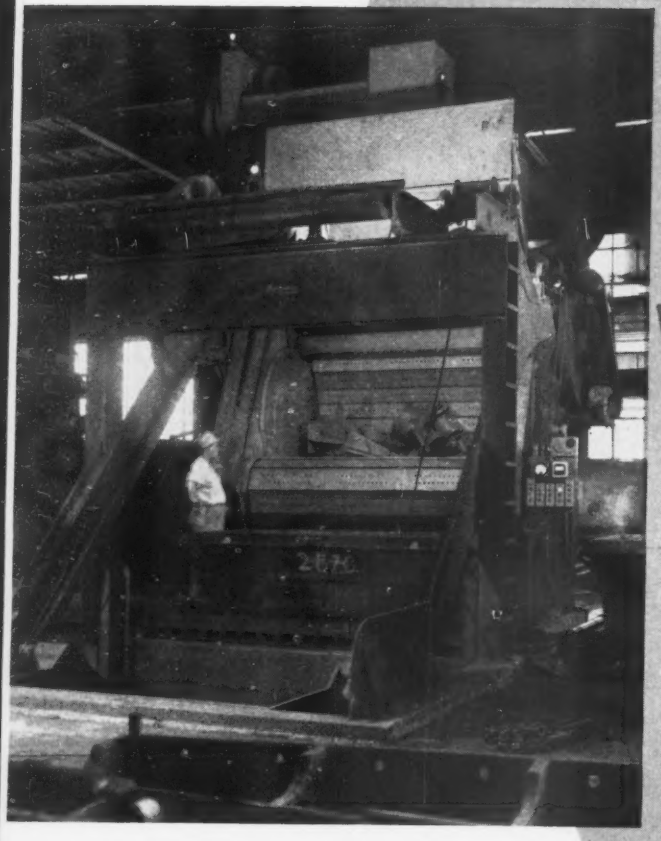
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

WHEELABRATOR®

Set the Pace for Peak Cleaning

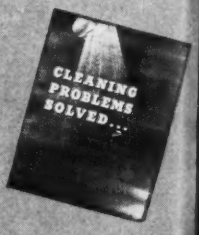


Typical Wheelabrator Contributions to Foundry Industry Progress

STEEL FOUNDRY

The 60" x 96" Wheelabrator Tumblast, developed by *American* in 1942 and proved by 10 years' actual operating experience, has been the most universal and productive blast cleaning machine ever built for the steel foundry. It cleans castings up to 72" long x 30" high, 6 to 10 per load; it cleans loads where castings weigh up to 2700 lbs. each; and it will handle 8 to 12 tons of annealed or green sand castings per hour.

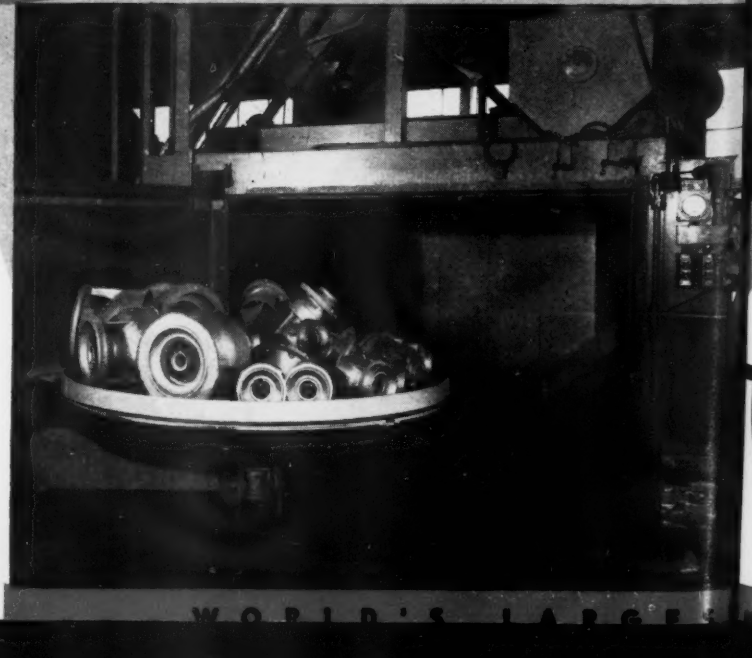
The tremendous productive capacity of this machine is reflected in its cost-saving performance. At Birdsboro Steel Foundry & Machine Co., for example, (see photo) it is cleaning 25% more tonnage than two airblast rooms, while slashing daily man-hour requirements from 54 to only 11.



NON-FERROUS FOUNDRY

The Wheelabrator Swing Table is an important contribution to the foundry requiring a moderately priced general purpose machine that will clean a wide variety of large and small pieces. No other single blast cleaning machine combines the versatility and work handling convenience of this popular design. Its speed and economy make it an ideal unit for cleaning large intricate pieces that normally would have to be blasted in an air-blast room.

In a typical installation, (see photo) Layne & Bowler, Inc., saved $5,290 yearly by replacing an airblast room and two tumbling mills. Cleaning time was slashed in half and 16½ man-hours were saved daily.



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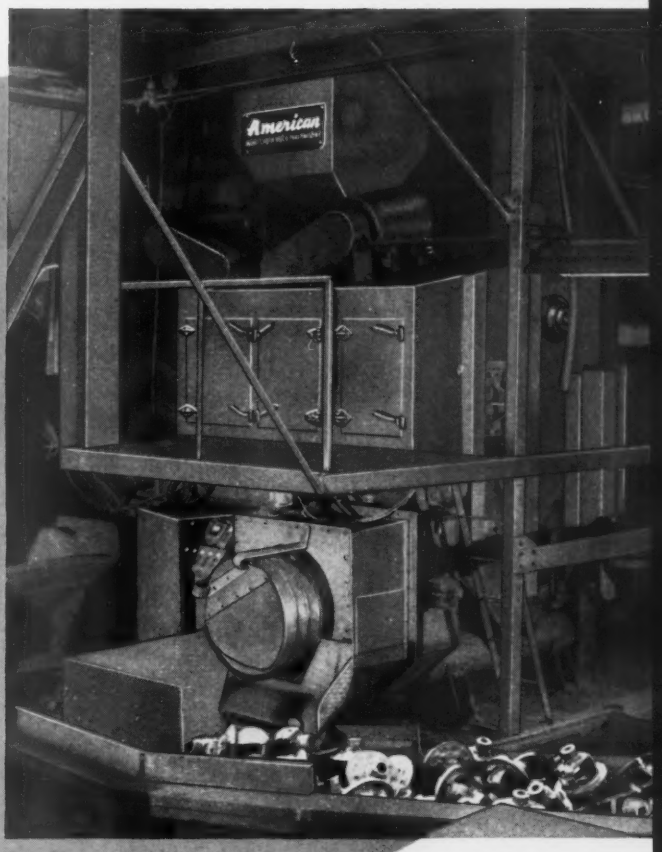
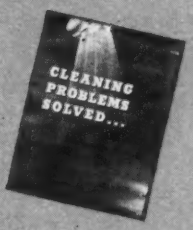


MALLEABLE FOUNDRY

Another *American* FIRST, *the Continuous Wheelabrator Tumblast.* Two of these machines are in operation at Auto Specialties Mfg. Co. One of these (see photo) is used for cleaning 12 tons of hard iron castings per hour without breakage. The other cleans the same work after annealing. Castings in both of these machines are cleaned uniformly and automatically without down time spent in loading, unloading, starting or stopping. Cleaning in the hard stage simplifies pre-annealing inspection; annealing can be done faster and more thoroughly; and the annealed work can be cleaned more quickly.



GRAY IRON FOUNDRY

Wheelabrator Monorail Cabinets. This important FIRST in the *American* record of achievements permits the continuous cleaning of a wide variety of jobs requiring special handling or large scale production. An almost endless variety of cleaning problems have been solved with this machine, including sanitary ware, soil pipe, cylinder blocks, textile loom frames, axle housings, etc. At Superior Foundry, Inc., (see photo) a Wheelabrator Monorail Cabinet cleaning work weighing from 5 lbs. to 600 lbs. each saves more than 15,000 man-hours yearly. It has cut cleaning time 50%, and the overall savings effected were sufficient to amortize the entire investment within two years.

WHEELABRATOR® STEEL SHOT

Produced by *American*, this heat treated electric furnace steel shot is a superior steel shot that gives lowest cleaning cost per ton. Send for Bulletin 89

American

WHEELABRATOR & EQUIPMENT CORP.

505 S. Byrkit St., Mishawaka, Ind.

MEMBER FEMA

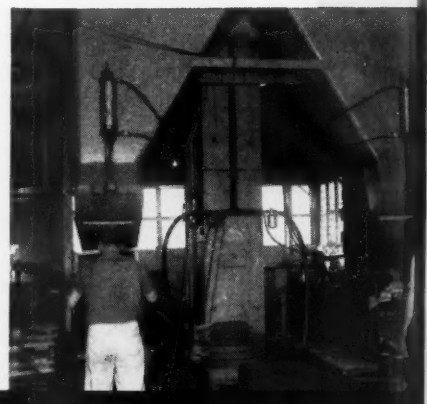
NOW Handy Sandy

to fill large flasks in seconds - that previously took several man hours

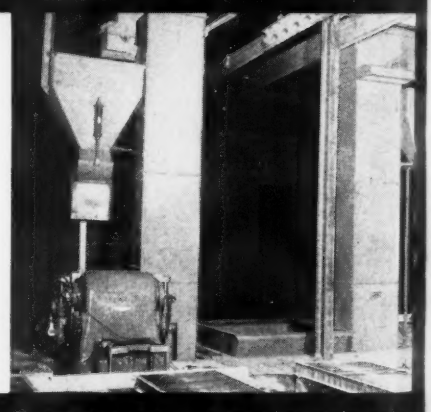
Now you can have all the cost-cutting advantages of the standard Handy Sandy for your larger size molds. The new Super Handy Sandy eliminates shoveling from molding on these jobs and multiplies the productivity of men and machines. This unit can handle up to 50 tons of sand per hour into the overhead hoppers where it is available to the molders without effort. Super Handy Sandy's big sand capacity makes it ideally suited for use with the bigger molding machines such as the heavy jolt squeeze pinlifts, rollover machines, bumpers, and automatic molding machines now being developed. Its use drastically reduces molding time on floor operations.

The savings possible through use of the Super Handy Sandy are almost unbelievable. In one test installation, mold production on large molds has been increased 150% due to savings in shovel time alone. With the Super Handy Sandy, one molder can fill more molds than several men with shovels. He merely operates an air valve and the sand falls into the flask. Thus he spends more time making molds and less time getting ready.

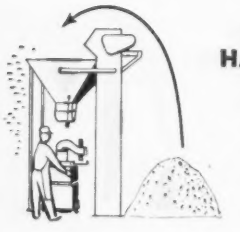
The Super Handy Sandy is a low-cost, individual-floor sand handling unit and incorporates an aerator at point of final discharge to molder's bins. It is available with single or double hoppers for supplying one or two molding stations. Two single hopper units can be installed with a common feed hopper when desired.



Close-up view of a Super Handy Sandy Twin Hoppers for supplying two mold stations.

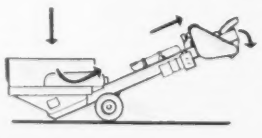


Two Single Hopper Super Handy Sandys a common feed hopper supplying both



STANDARD HANDY SANDY

puts the sand pile overhead to eliminate shoveling for the molder.



STANDARD REDDY SANDY

takes the hard work out of shake-out and sand preparation.

SEND NOW FOR COMPLETE INFORMATION

NEWAYGO ENGINEERING COMPANY

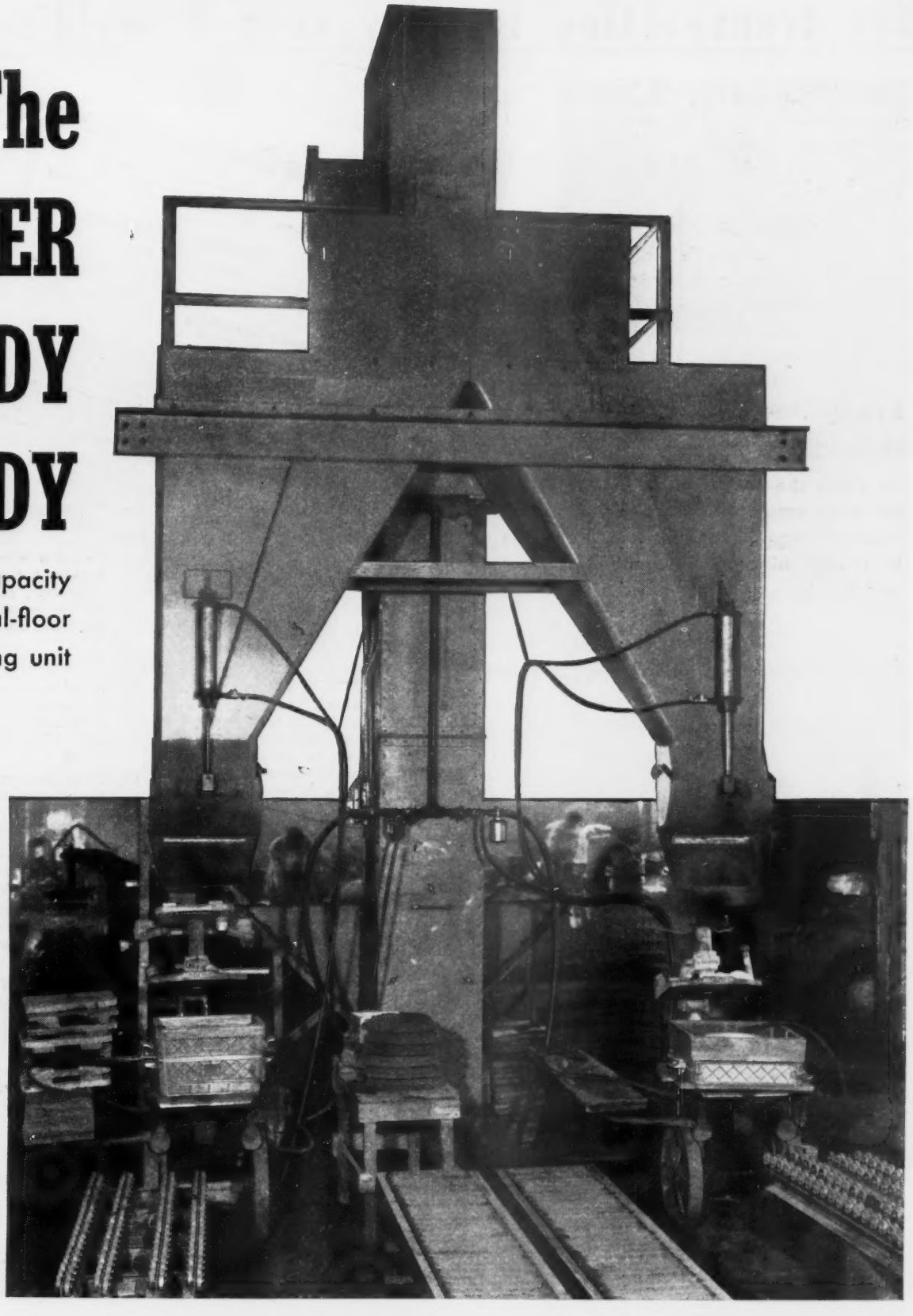
Newaygo, Michigan

Manufacturers of Neway® Mold Handling, Sand Handling and Condition

...has a Big Brother!

The SUPER HANDY SANDY

a high capacity individual-floor sand handling unit

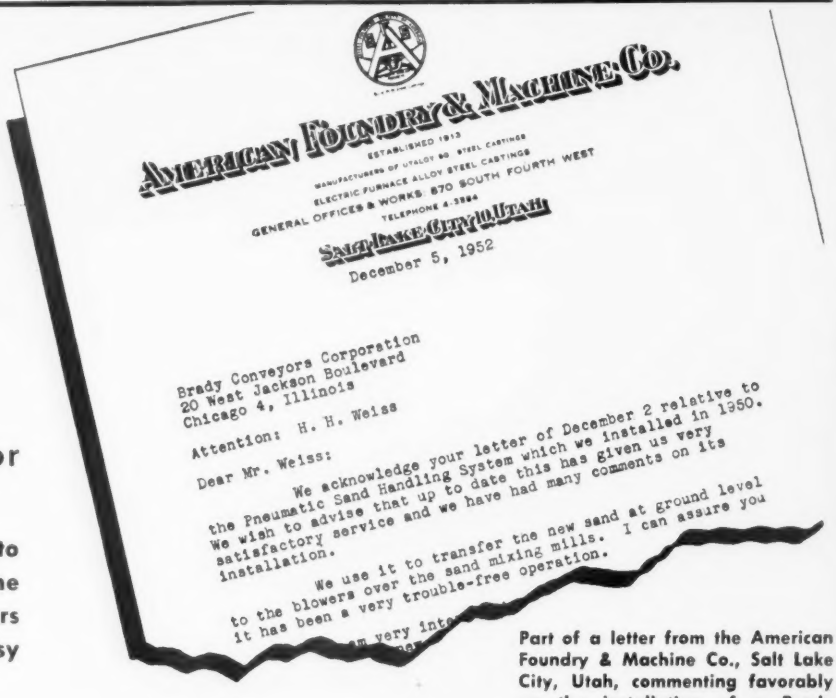


BRADY FLO-VEYOR SYSTEMS

for transporting foundry core & molding sand

Brady Pneumatic System for Unloading Box-cars.

By using the special nozzle attached to the hose sand can be unloaded at the rates of 10 to 30 tons an hour from cars to storage bins. The operation is easy and rapid.



AMERICAN FOUNDRY & MACHINE CO.

ESTABLISHED 1913
MANUFACTURERS OF UTALOY 80 STEEL CASTINGS
ELECTRIC FURNACE ALLOY STEEL CASTINGS
GENERAL OFFICES & WORKS 870 SOUTH FOURTH WEST
TELEPHONE 4-3984
SALT LAKE CITY 10, UTAH

December 5, 1952

Brady Conveyors Corporation
20 West Jackson Boulevard
Chicago 4, Illinois

Attention: H. H. Weiss

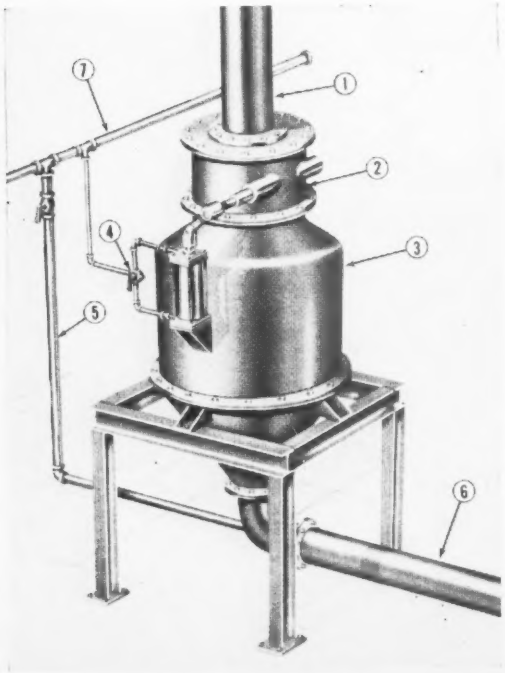
Dear Mr. Weiss:

We acknowledge your letter of December 2 relative to the Pneumatic Sand Handling System which we installed in 1950. We wish to advise that up to date this has given us very satisfactory service and we have had many comments on its installation.

We use it to transfer the new sand at ground level to the blowers over the sand mixing mills. I can assure you it has been a very trouble-free operation.

...m very int...

Part of a letter from the American Foundry & Machine Co., Salt Lake City, Utah, commenting favorably on the installation of a Brady Pneumatic Sand Handling System.



The Brady FLO-VEYOR system for transporting foundry core and molding sand from cars to remote delivery points, from process points to shipping points, or from any one place to another wherever a pipe line can be run, is so efficient it actually pays for itself. Cleanliness, flexibility and rapid handling permits large volume to flow through comparatively small pipe sizes. Note the features built into the pressure vessel, which is the heart of the system:

(1) Type of filling determines the type of connection to the FLO-VEYOR.

(2) Gate operation can be manually, automatically or remotely controlled by compressed air or electric motor.

(3) Pressure vessel (FLO-VEYOR) can be built to accommodate different capacities per hour.

(4) Hand operated or remote control operated air cylinder closes gate and stops flow of material when pressure vessel is filled.

(5) High pressure or low pressure air is introduced at points necessary to aerate and fluidize material to be conveyed.

(6) Pipe sizes determined by capacities per hour and distance material is to be conveyed.

(7) Air is supplied from either low or high pressure air compressors to various points in FLO-VEYOR.

The FLO-VEYOR has a low initial cost and low maintenance. It is dustless, self-cleaning, versatile, and saves labor and space. Tell us something about your sand or other granular material handling-problems, and we will be happy to quote you on your requirements.

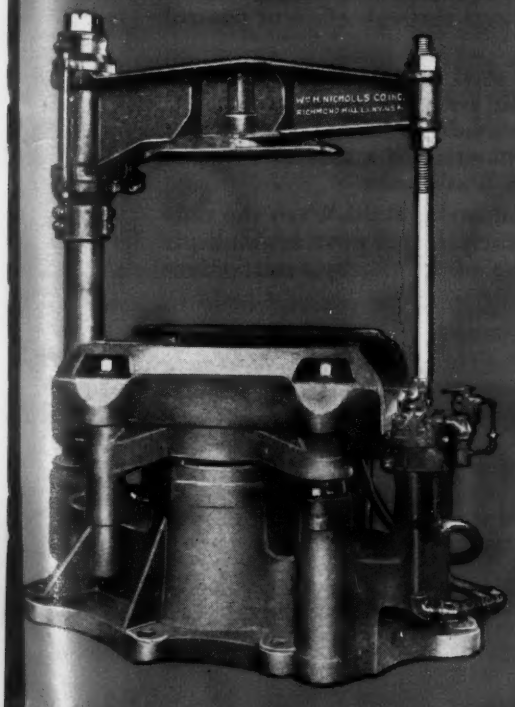
THE BRADY CONVEYORS CORPORATION
20 WEST JACKSON BOULEVARD, CHICAGO 4, ILLINOIS, U. S. A.

A Standard Maintained

In The Foundry Industry

NICHOLLS

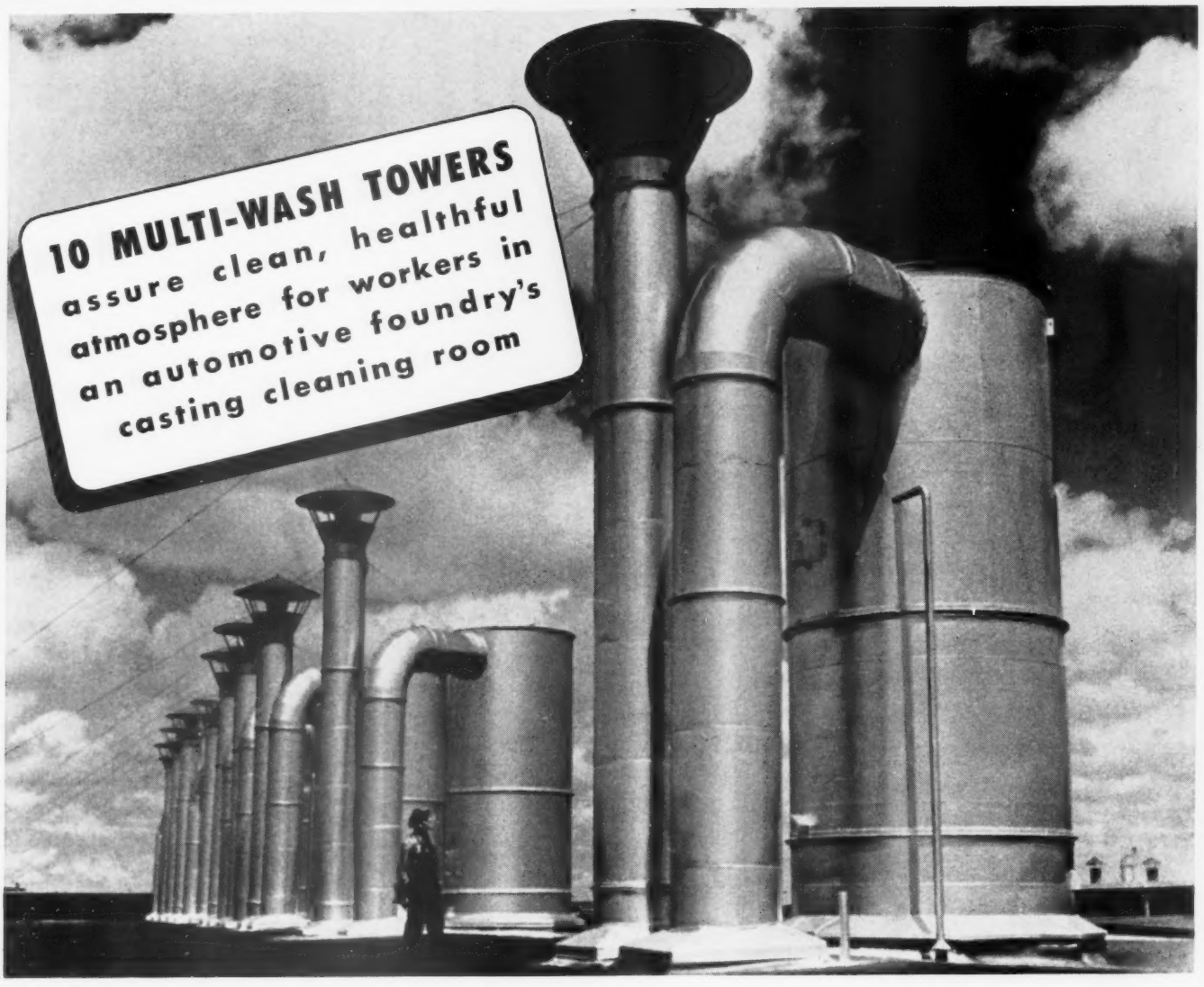
HEAVY DUTY MOLDING MACHINES



Your help . . . your continued support . . . helped make us leaders in our field. To us, that leadership means greater service to you in the future. Nicholls Molding Machines of Today . . . and Tomorrow . . . will reflect that welcome responsibility in progressive power and precision.

WM. H. NICHOLLS CO., INC.

RICHMOND HILL (18), LONG ISLAND, NEW YORK



This recent Schneible Multi-Wash installation is typical of many such systems that are today helping management get that extra worker incentive necessary to produce more and better castings. A noticeable lift to output and employee relations has been the result of providing clean, healthful surroundings through efficient control of foundry fumes and dirt.

These 10 Multi-Wash units, having a total of 130 washing stages, remove the dirt from 350,000 cfm of air every minute. Water, at the rate of 1500 gallons per minute, is recirculated through the system to remove and convey the collected material to a central disposal tank, which also serves 40 other Multi-Wash units.

Schneible patents cover all features that make Multi-Wash the only dust collector using the wet method principle, that provides multiple washing action and an efficiency rating of 99.9%, by actual scientific tests.

PRODUCTS:
Water Curtain Cupola Collectors
Multi-Wash Collectors • Uni-Flo
Standard Hoods • Uni-Flo
Compensating Hoods • Uni-Flo
Fractionating Hoods • Ductwork •
Velocitrap • Dust Separators •
"Wear Proof" Centrifugal Slurry
Pumps • Settling and Dewatering
Tanks • Entrainment Separators

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station
Detroit 2, Michigan

ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

SCHNEIBLE

Late Foundry News

APRIL 17, 1953

SEACOAL FREIGHT RATES: Foundries will pay additional freight charges on seacoal facing of 20 cents to $1.60 a ton in car lots, if rate changes proposed by the railroads go into effect. An opportunity for consumers and shippers to protest against the increase will be provided at a meeting of a Joint Committee of Carriers to be held in New York, May 15. The Foundry Facings Manufacturers Association plans to present a brief at this meeting in opposition to the rate change, and invites seacoal consumers to join it in its stand. Letters of protest should be sent to the FFMA secretary, 1508 Law & Finance Bldg., Pittsburgh. Seacoal freight rates now are based on 20 per cent of first-class rates as shown in the classification tariffs. The roads propose to put seacoal on new uniform classification rates published recently, and to cancel the current exceptions rating on ground coal, under which classification seacoal is shipped.

BUSY WEEK: With a larger than usual technical program scheduled for the AFS convention that opens in Chicago on May 4, visiting foundrymen are in for a busy week. Monday and Tuesday will be especially active, since more than one-half of all sessions will be held on those two days. Brass and bronze, light metals and malleable iron meetings are concentrated on Monday and Tuesday; gray iron on Wednesday, Thursday and Friday; and steel on Thursday and Friday. Those interested in shell molding will have their choice of seven discussions on the subject, five to be presented on Tuesday at pattern, sand, and gray iron shop course sessions, and two at the Light Metals Division luncheon on Monday. Program details will be found in this issue starting on page 152.

PIG IRON EXPANSION: Office of Defense Mobilization has revised upward its expansion goal for blast furnace capacity by 2 million tons. The new goal is 87 million tons annual capacity, to be completed by Jan. 1, 1955, and compares with 70.3 million tons on Jan. 1, 1950. The additional capacity is intended to help fill requirements for steel ingot production; however, indirectly it will bolster potential pig iron supply for foundry use.

BUSINESS OUTLOOK: Latest monthly business survey by the National Association of Purchasing Agents reports general industrial activity growing in March but at a much slower rate than in January and February. New orders are substantial in number and smaller in quantity. Backlogs are declining somewhat more rapidly. The consensus of buyers on the effect of price decontrol is that, while the action was long overdue, the result will be salutary, permitting the free use of negotiation. Full impact is not expected to be felt until CMP controls are released June 30, giving full play to open competition.

CMP TO DMS: Essential difference between the new Defense Materials System that takes over July 1 and the Controlled Materials Plan it will replace is this: Under CMP, the government has been allocating all steel, copper and aluminum for both defense purposes and the entire civilian economy. Under DMS, the government steps out of the civilian side of the materials control picture. Starting in July rated orders for defense work (military and AEC orders) will carry the symbols, A, B, C, D, or E. Manufacturers receiving such rated orders will, by self-certification and without filing any application, use the rating DO-B-5 to obtain materials other than controlled materials to fill the orders.

PLANT CONSTRUCTION: Wheland Co., Chattanooga, Tenn., has been granted a certificate of necessity for rapid tax amortization of 85 per cent of the cost of the plant it will build to produce primary aluminum. The facilities are estimated to cost more than $22 million. Aluminum Co. of America, Cleveland, has received approval of a certificate covering $100,000 facilities for heat treating magnesium castings. Latest certificate approvals bring to well over $25 billion the cost of plants and equipment for which rapid tax writeoff has been approved to date. Of this sum, represented by 16,191 projects, only 61 per cent is eligible for rapid depreciation.

PERSONALS: John Slezak, president, Turner Brass Works, Sycamore, Ill., and former chief of the Chicago Ordnance District, has been appointed assistant secretary of the Army in charge of material procurement . . . Walter R. Jaeschke, Whiting Corp. consulting engineer, went to Hallesfornas, Sweden, recently to supervise initial operation of two pulverized coal-fired duplexing furnaces in the malleable foundry of A. B. Jarnforadling. This is the first installation of its type in Sweden . . . John R. McVeigh, formerly research engineer with

Kennametal Inc., Latrobe, Pa., has been named by Alloy Engineering & Casting Co., Champaign, Ill., as chief engineer and engineering executive of its Armed Services Research & Development Projects . . . Gustave H. Kann, president, Pittsburgh Crushed Steel Co. and its subsidiaries, and a director of the Foundry Equipment Manufacturers Association, died Apr. 9 in Pittsburgh . . . C. E. Hoyt, former executive vice president of the American Foundrymen's Society, and Jane Reininga, for many years assistant secretary of AFS, were married in Oak Park, Ill., Apr. 6 . . . Frank E. Fisher, formerly chief of the Foundry Equipment and Supplies Section of the NPA Metalworking Equipment Division, has joined U. S. Air Force Headquarters as chief of the Metals Section, Material Division of Industrial Resources.

WESTERN EXPANSION: More than 300 eastern manufacturers have branch plants in the Los Angeles area, and 31 per cent of them have been established in the last three years. This is shown in a recent survey by the Los Angeles Chamber of Commerce.

NEW RESEARCH GROUP: British Steel Castings Research Association has been formed as the outgrowth of the British Steel Founders' Association Research and Development Division. Chairman is F. N. Lloyd, chairman and managing director, F. H. Lloyd & Co. Ltd. J. F. B. Jackson, who has guided the research activities of the division, will continue as director of research.

FOUNDRIES NEED NICKEL: Meeting with NPA recently the Steel Castings (High Alloy) Industry Advisory Committee declared that additional quantities of primary nickel or nickel alloy scrap must be made available to the industry if it is to meet customers' requirements. The group said foundries are unable to compete with other users in buying scrap since price of this material was decontrolled. It was recommended that NPA continue to control allocation and use of nickel, also that monthly melt schedules continue to be used. The latter are submitted each month by steel producers and processors who use nickel as well as other alloying materials in production of corrosion and heat resisting steels.

PRICES OF FOUNDRY METALS AND COKE (As of Apr. 17, 1953)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50-17.50
New River	20.80
Wise County	15.95
OVEN	
Birmingham	$21.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	26.05
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
New Haven, Conn.	23.45
Painesville, O.	25.50
Philadelphia	23.95
Portsmouth, O.	24.00
St. Louis	26.00
Swedeland, Pa.	23.85
Terre Haute, Ind.	24.05

PIG IRON

	(Per gross ton f.o.b. furnace) No. 2 Foundry	Malleable
Bethlehem, Pa.	$57.00	$57.50
Birmingham	51.38	....
Buffalo	55.00	55.50
Chicago	55.00	55.00
Cleveland	55.00	55.00
Everett, Mass.	59.50	60.00
Fontana, Calif.	61.00	....
Geneva, Utah	55.00	....
Granite City, Ill.	56.90	57.40
Lone Star, Tex.	51.00	51.00
Neville Island (Pittsburgh)	55.00	55.00
Steelton, Pa.	57.00	57.50
Swedeland, Pa.	59.00	59.50
Toledo, O.	55.00	55.00
Troy, N. Y.	57.00	57.50
Youngstown, O.	55.00	55.00

NONFERROUS INGOT

BRASS AND BRONZE: 85-5-5-5—29.50c; 88-10-2—41.75c; 80-10-10 — 35.00c; No. 1 yellow — 24.00c.

ALUMINUM: 99 per cent plus, primary ingots 20.50c. Secondary No. 12 alloy 22.00-23.50c. Deoxidizing grades: No. 1 24.00-26.00c; No. 4, 21.50-22.50c.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 30.00-33.00c, Connecticut valley; Lake 33.25c, delivered.

ZINC: High grade 12.35c, delivered. Die casting alloy 15.50c, delivered.

IRON AND STEEL SCRAP

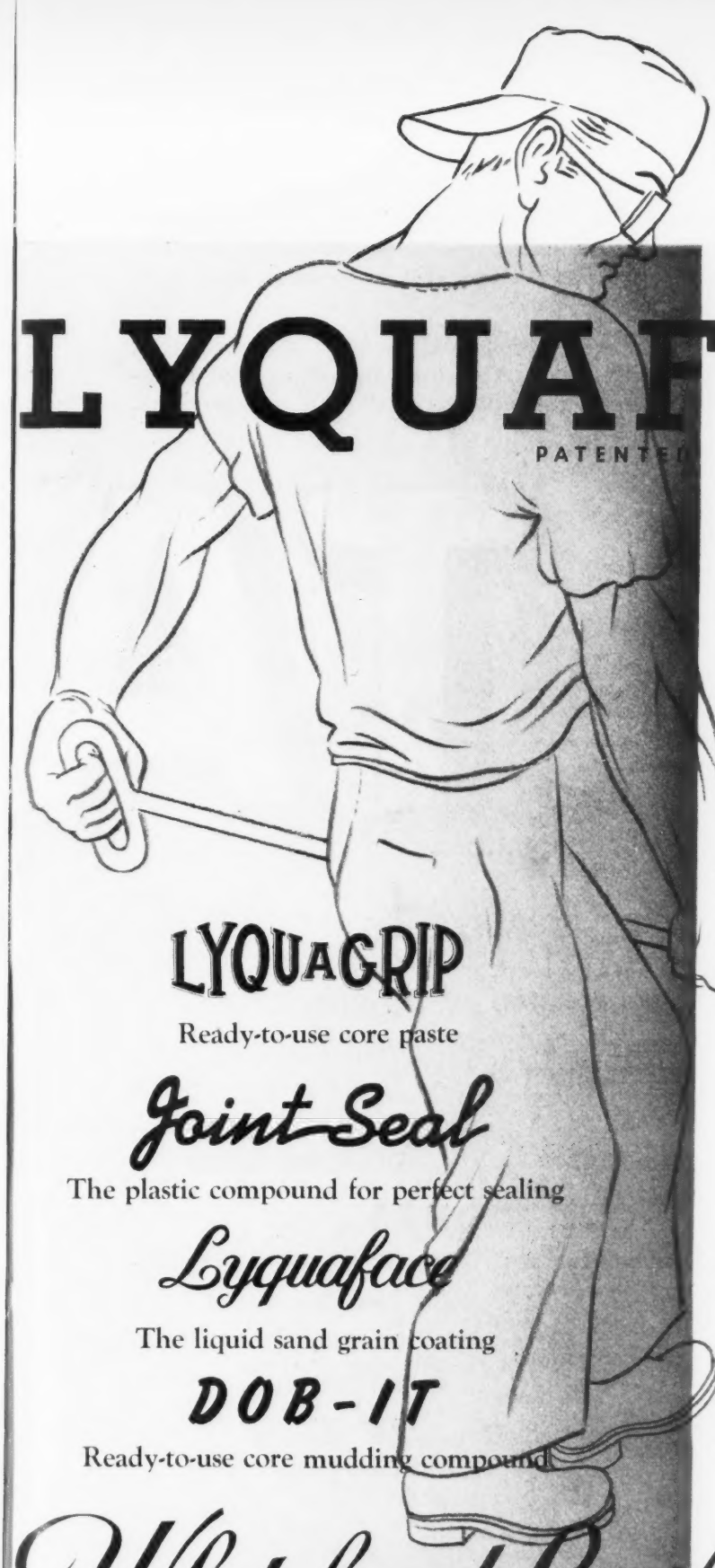
(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$37.00-38.00	**$42.00-43.00	**$33.00-34.00	**$52.00	**$42.00-43.00	.....	$46.00-47.00
Boston*	34.17	34.00-35.00	.....	.....	46.00-47.00	.....	.....
Buffalo	45.50-46.50	**42.50-43.00	.....	.....	**45.50-46.00	.....	52.00-53.00
Chicago	41.00-42.00	42.00-44.00	38.00-39.00	47.00-49.00	46.00-48.00	45.00-47.00	55.00-57.00
Cincinnati**	45.50	45.00	38.00	43.00	49.00	49.00-50.00	59.00-60.00
Cleveland	41.50-42.50	47.00-48.00	44.00-45.00	52.00	49.00	50.00-51.00	58.00-60.00
Detroit*	39.00-40.00	47.50	44.00	50.00	.....	48.00	.....
Los Angeles	30.00	38.00-41.00	.....	.....	.....	.....	.....
New York*	37.00	39.00-40.00	39.00-41.00	.....	45.00-46.00	.....	.....
Philadelphia	44.00-45.00	43.00-44.00	45.00-46.00	.....	49.00-50.00	46.00-47.00	58.00-59.00
Pittsburgh	44.00	47.00-48.00	43.00-44.00	.....	51.00-52.00	49.00-50.00	55.00-57.00
San Francisco	30.00	38.00	45.00	52.00	52.00	55.00	42.00-45.00
Seattle	33.00	**40.00	**36.00-38.00	.....	.....	.....	.....

* Brokers' buying prices. ** F.o.b. shipping point.

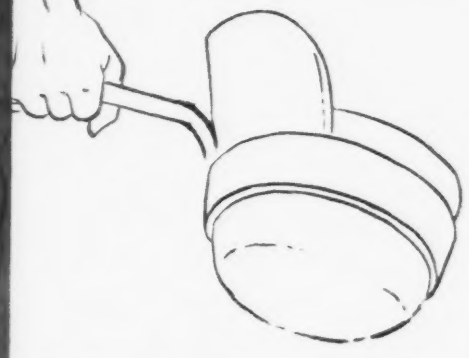
LYQUAFLOUR

PATENTED



This *ONE* additive to sand has all the properties of several other products

1. **LYQUAFLOUR** permits the use of ONE carbonaceous material to obtain the properties of several.
2. **LYQUAFLOUR** peels your casting.
3. **LYQUAFLOUR** corrects expansion problems.
4. **LYQUAFLOUR** permits hard ramming.
5. **LYQUAFLOUR** imparts flowability to sand.



6. **LYQUAFLOUR** requires no rigid control.
7. **LYQUAFLOUR** being slightly moist is not dirty or dusty.
8. **LYQUAFLOUR** is not subject to spontaneous combustion.

You owe it to yourself to investigate our claims.

LYQUAGRIP
Ready-to-use core paste

Joint-Seal
The plastic compound for perfect sealing

Lyquaface
The liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

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EVERY DELTA Foundry Product is backed by continuing and exhaustive laboratory research to safeguard quality and maintain absolute uniformity. From raw materials to the finished product manufacturing processes proceed under an automatic and persistent policy of laboratory control.

DELTA Foundry technicians are specialists in cutting cleaning room costs by providing formulas for the rapid production of finer-finished castings, which require a minimum of cleaning room time.

DELTA

FOR MOLDS

DELTA Core & Mold Washes for steel, malleable, gray iron and non-ferrous metals.

PERMI-BOND (seacoal replacement)

PARTEX (Nut Shell Parting)

Liquid Parting

Spray Binders

BONDITE

Mold Seal Compounds

Sand Conditioning Oils

96-B SAND RELEASE AGENT

DRI-BOND BINDER

FOR CORES

DELTA Core & Mold Washes for steel, malleable, gray iron and non-ferrous metals.

Mudding and Patching Compounds

No-Vein Compound

DRI-BOND BINDER

Core Rod Dip Oils

Sand Conditioning Oils

Core Oils

PARTEX (Nut Shell Parting)

Liquid Parting

BONDITE

Core Paste

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A COMPLETE LINE OF *Scientifically* CONTROLLED FOUNDRY PRODUCTS FOR *FASTER PRODUCTION* OF FINER-FINISH CASTINGS

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Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

Dry dipping with DELTA Z-Z-KOAT

Green dipping with DELTA GRAKOAT

Dry dipping with DELTA GRAKOAT

Photographs Courtesy of Studebaker Corporation

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for longer, faster, more economical portable grinding of welds and casting

Sterling offers a wide choice of abrasive shapes and sizes for the quick solution of your weld and casting grinding problems. Here is a complete line of abrasive items, especially designed to reach any recess or remove fins, parting lines, and various defects.

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Whether your problem is the grinding of large or small units, we can readily specify a pre-determined wheel formula in an almost limitless range of abrasive items ranging from small, mounted points with detachable spindles (a special Sterling feature) and properly shaped cones to large wheels for casting and billet grinding.

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Send today for this complete file of literature giving full information on proper wheels to use for regular or special grinding. This free information will be sent immediately upon request.

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QUARRIES COMPANY

LOS ANGELES — NEW YORK — DISTRIBUTORS IN ALL PRINCIPAL CITIES

■ Composite photo showing a drum of chemicals being put through a variety of handling motions by the Baker "Octopus."

THE BAKER-RAULANG CO. 1853 100th anniversary 1953 THE BAKER-RAULANG CO.

This BAKER TRUCK handles any shape load...

and stacks it in any position!

■ You name the load—the Baker "Octopus" illustrated will handle it, whether it's a drum, a roll of newsprint, a packing case, a piece of machinery, a bale of cotton or a pallet load of cartons. Moreover, it will pick it up, transport it, raise or lower it, shift it to left or right, revolve it, up-end it, or stack it in any position. In fact, it will handle it with no more physical effort than is needed to operate the simple hydraulic controls.

The "Octopus" consists of a standard Baker Fork Truck equipped with a variety of Baker attachments—360° revolving head, 4-purpose carriage, up-ender, drum clamp, etc.—which may be applied individually or in combinations. While one truck may never be called on to perform all these functions, the "Octopus" demonstrates the range of utility of Baker fork trucks and attachments.

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- CUT FASTER
- LAST LONGER
- AT LOWER COST

Clipper Superior Blades are guaranteed to . . . "Provide the Fastest Cut . . . at the Lowest Cost!"

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ONE OF 5 MODELS
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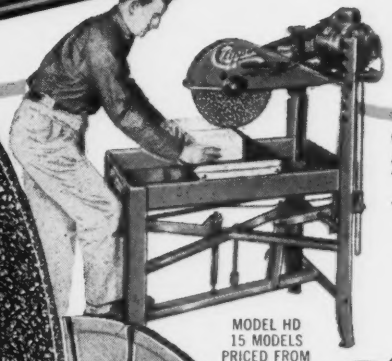

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Clipper Superior Blades are manufactured under rigid control . . . assuring consistent quality. You are guaranteed peak performance . . . at the lowest possible cost with every blade.

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"CBR" Break-Resistant

CLIPPER BLADES to fit Every Make and Model Masonry – Concrete – Hand Power Saw

Your guarantee of the finest, fastest, most economical masonry and concrete cutting is the familiar Clipper Trade Mark on a Wet Abrasive — Dry Abrasive — "CBR" (Break-Resistant) — or a Diamond Blade.

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Any masonry material can be cut in seconds with either a "WET" or "DRY" specification. New type Clipper Abrasive Blades approach the cutting speed of diamonds.

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No other means of masonry or concrete cutting can equal the cutting speed of a Clipper Diamond Blade. Only Clipper has every necessary specification to do your cutting job.

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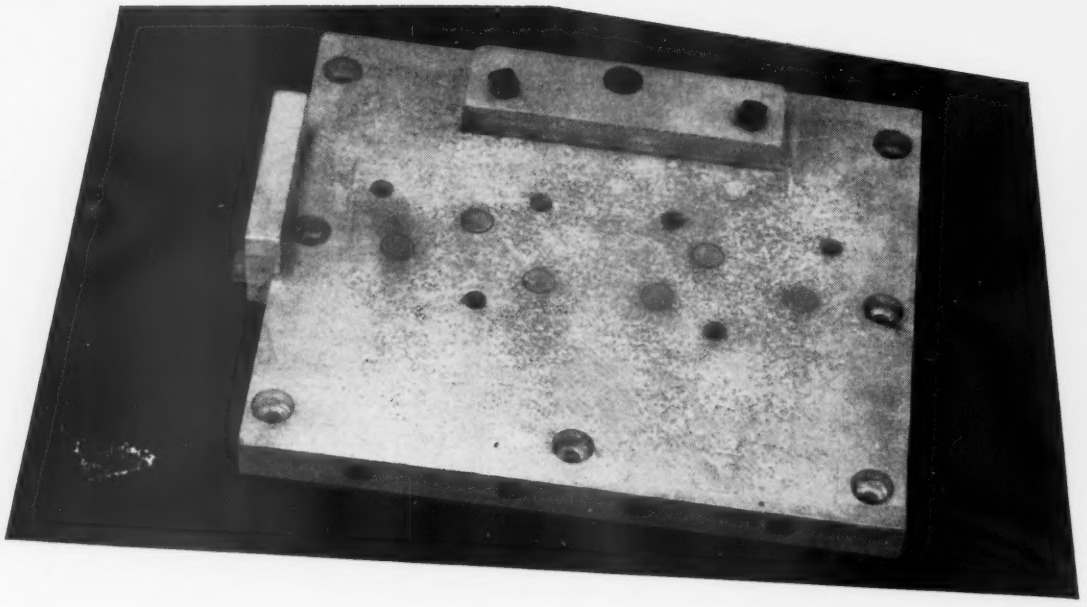
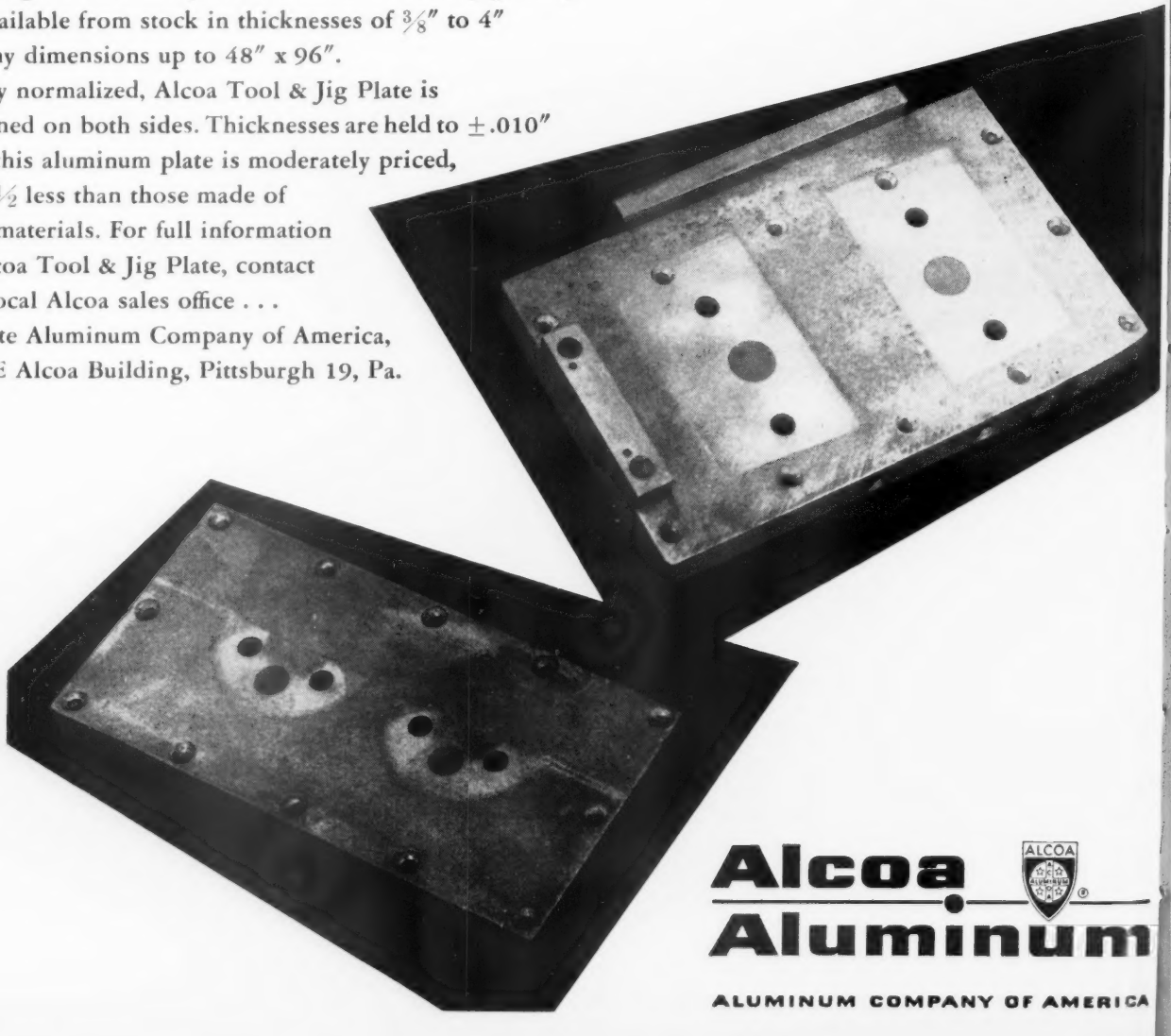
CITY _____ STATE _____



These core blower plates cost less

than those made of other materials. They're lightweight aluminum (Alcoa Aluminum Tool & Jig Plate) . . . available from stock in thicknesses of $\frac{3}{8}$″ to 4″ and any dimensions up to 48″ x 96″.

Fully normalized, Alcoa Tool & Jig Plate is machined on both sides. Thicknesses are held to ±.010″ —yet this aluminum plate is moderately priced, up to $\frac{1}{2}$ less than those made of other materials. For full information on Alcoa Tool & Jig Plate, contact your local Alcoa sales office . . . or write Aluminum Company of America, 1949-E Alcoa Building, Pittsburgh 19, Pa.



Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

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THE SURE START TO A PERFECT FINISH

"Makes better, smoother castings"

Join the increasing number of foundrymen who are benefiting by the advantages that make PENN SAND a natural for your foundry. The unique grain structure and distribution of this quality Silica Sand give lower confined expansion and higher permeability in the same sand. Make castings with better finish, reduce rejects and lower your cleaning room costs. . . . use PENN SAND.

Write today for further details and free samples.

They all say...
"Since we started using Penn Sand we make
✓ better castings with
✓ fewer rejects & have
✓ lower cleaning costs."

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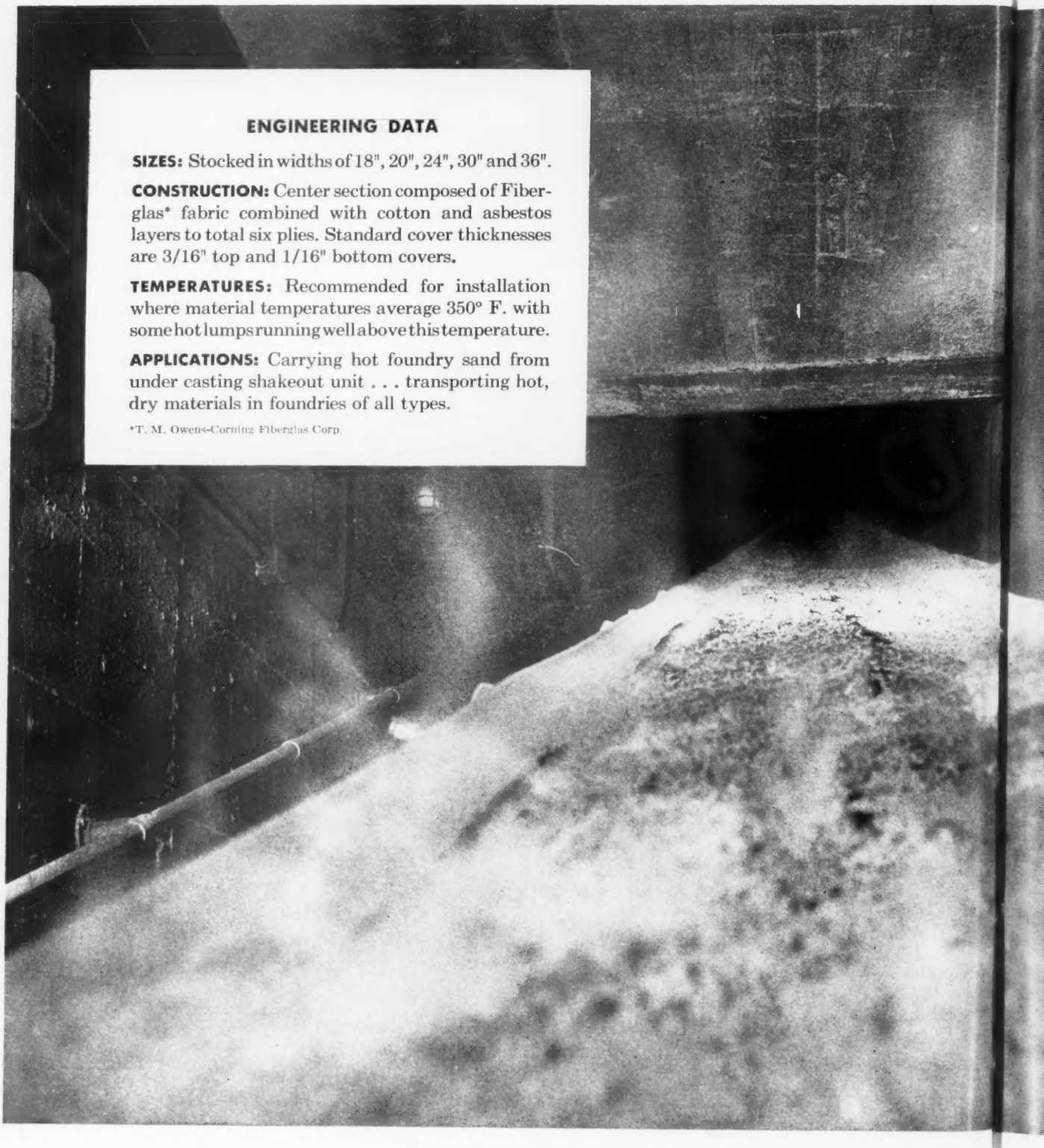
$3,593.81 Saving Made b



ENGINEERING DATA

SIZES: Stocked in widths of 18", 20", 24", 30" and 36".

CONSTRUCTION: Center section composed of Fiberglas* fabric combined with cotton and asbestos layers to total six plies. Standard cover thicknesses are 3/16" top and 1/16" bottom covers.

TEMPERATURES: Recommended for installation where material temperatures average 350° F. with some hot lumps running well above this temperature.

APPLICATIONS: Carrying hot foundry sand from under casting shakeout unit . . . transporting hot, dry materials in foundries of all types.

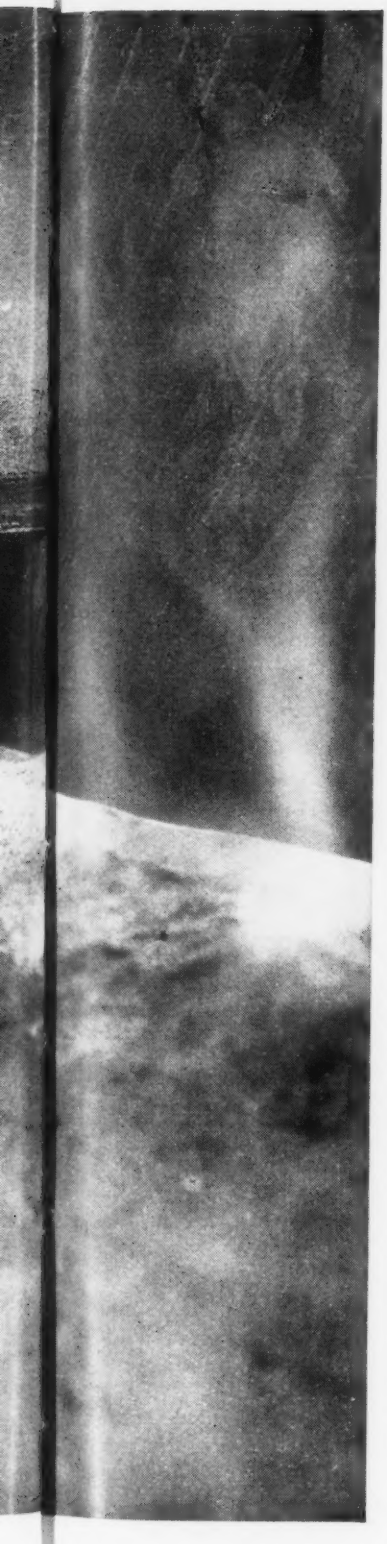
*T. M. Owens-Corning Fiberglas Corp.

HEWITT-ROBINS INCORPORATED

HEWITT-ROBINS

DIVISIONS: HEWITT RUBBER • ROBINS CONVEYORS • ROBINS ENGINEER

eby this Foundry Belt



Hewitt-Robins Fiberglas Belt Cut Belt Operating Costs 55% During 15 Months of Trouble-Free Operation

CUSTOMERS' PERFORMANCE RECORD

EQUIPMENT:

Hewitt-Robins 30" Maltese Cross® Fiberglas Conveyor Belt.

LOCATION:

Columbia Malleable Castings Division, Grinnell Company, Columbia, Pennsylvania.

MATERIAL HANDLED:

Hot foundry sand from four Mechanical Shakeout Units at temperatures well over 350° F.

PERFORMANCE:

This Maltese Cross Fiberglas Belt saved 55% in belt operating costs during a total of 4,779 production hours. The actual operating cost per hour was only $0.619 compared to $1.371 for other brands of belts previously used on the job.

RESULTS:

Eliminated down time for frequent belt changes . . . eliminated loss of metal due to belt breakage . . . saved $3,593.81 during 15 months of dependable, trouble-free service. Based upon the outstanding performance of the original belt, this plant has installed two additional Hewitt-Robins Maltese Cross Fiberglas Belts.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR FOUNDRY

- ☐ FOUNDRY SHAKEOUTS
- ☐ SSC UNIT

CONVEYORS:

- ☐ —Belt
- ☐ —Vibrating

BELTING:

- *☐ —Hot Materials
- *☐ —General Conveyor
- ☐ —Woven Wire

HOSE:

- *☐ —Air
- *☐ —Water
- *☐ —Steam
- *☐ —Fire
- *☐ —Twin-Weld®
- *☐ —Servall®
- *☐ —Water Suction

- ☐ BUCKET ELEVATORS
- ☐ MECHANICAL FEEDERS
- ☐ SAND SCREENS
- ☐ CAR SHAKEOUTS
- ☐ SCREEN CLOTH
- ☐ IDLERS
- ☐ BELT CLEANERS
- *☐ RUBBERLOKT® BRUSH

*For immediate information about these industrial rubber products, call your Hewitt Rubber Distributor. (See "Rubber Products," Classified Phone Book.)

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

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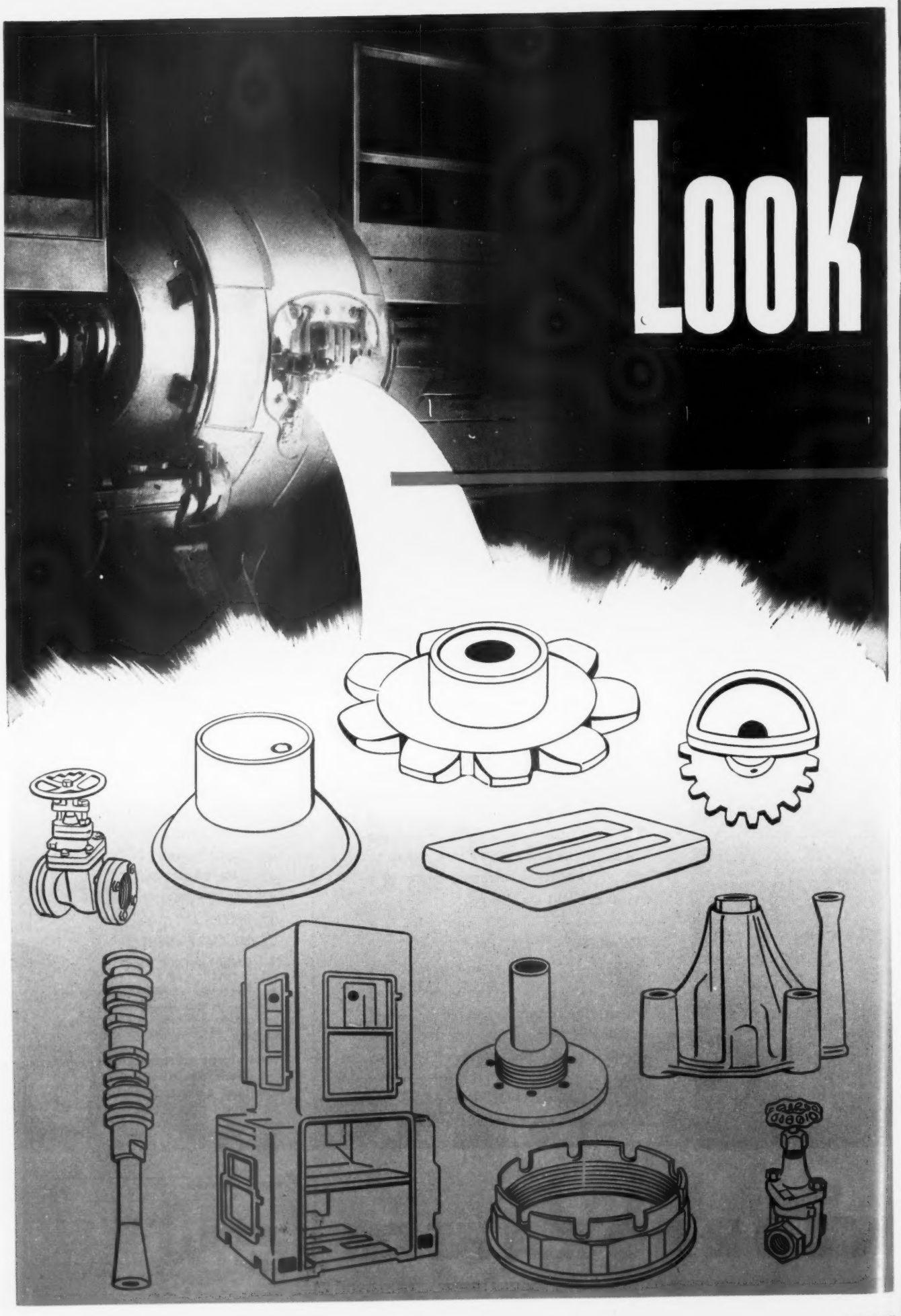

Look

what comes out...

of Detroit ROCKING Electric Furnaces

These versatile furnaces provide uniform heats for an amazing variety of quality products

The day's work of Detroit Rocking Electric Furnaces in the nation's foundries ends up as valves, automotive castings, bases and component parts for machines, gears, rings, splines, bearings, bushings, electrical contacts. Shapes range from simplest to most complex. Metals, too, range the list—steel, bronze, brass, iron and their alloys.

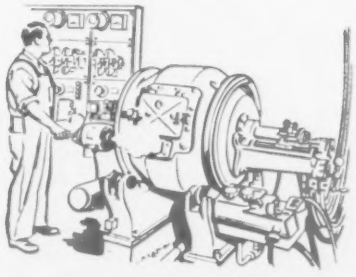
Wherever they are used, Detroit Rocking Electric Furnaces produce uniform, high-quality metal. When the pattern of operation is set, metal composition and melting cycle is duplicated in production heat after heat and day after day.

Rocking action of these furnaces delivers real advantages. The controlled motion means homogeneity of the metal. As the molten metal washes back and forth, it picks up heat from the refractory, increasing furnace efficiency and refractory life.

As for economy, here are some of Detroit Rocking Electric Furnace benefits: (1) optimum use of power; (2) reduced metal shrinkage; (3) more *usable* metal per melt; (4) fewer rejected castings; (5) more heats per day; (6) less out-of-production time since shells are easily replaced; (7) longer lining life; (8) longer furnace life.

Detroit Rocking Electric Furnaces may well be the best solution to your melting problems, too. Our engineers will work with you to give you facts on high efficiency, operating economy, and quality control, fitted to your production requirements. Write today!

Faster heats, better metal



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DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

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Wheels built to give you the

"TOUCH OF GOLD"

for rough grinding

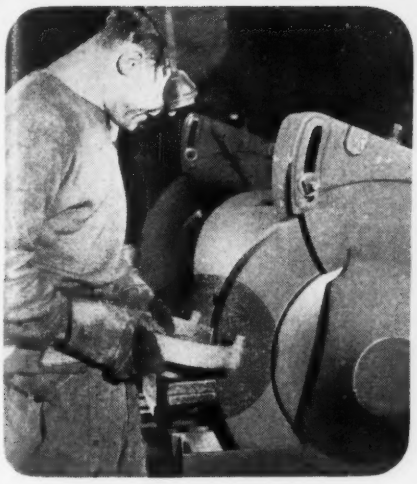
You have the "Touch of Gold" when the grinding wheel you are using exactly fits the job. Then each turn of the wheel adds value to the product and profit-margin to the operation. This is equally true whether you are working on ferrous or non-ferrous metals—on portable, floorstand or swing-frame machines.

Foundry men know that the selection of the *right* wheel assures faster stock removal. Longer-lasting, more efficient wheels contribute importantly to shop performance and profits.

Norton's 56-page booklet on "Rough Grinding" can be a money-saver for foundry men. It is a real help in selecting the right grinding wheels. It covers many different applications including specific recommendations for grinding tough alloy and carbon steel, cast iron, soft malleable, hard malleable, brass, aluminum and magnesium. Ask your nearby Norton distributor's representative for a copy of this booklet or write direct for Booklet 1405F. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Inc., Worcester 6, Mass.

See your Norton distributor for aid in grinding wheel selection

Your Norton distributor will be glad to show you how the right grinding wheel can help you do your foundry grinding in the shortest possible time, at the lowest possible cost. Ask him for his recommendations. He's listed under "Grinding Wheels" in your classified telephone directory. He'll tell you more about the "Touch of Gold."



A NORTON WHEEL FOR FLOORSTAND GRINDING is made to do the job just right considering the spindle speed, type of metal to be ground, amount of grinding pressure applied, and area of contact.

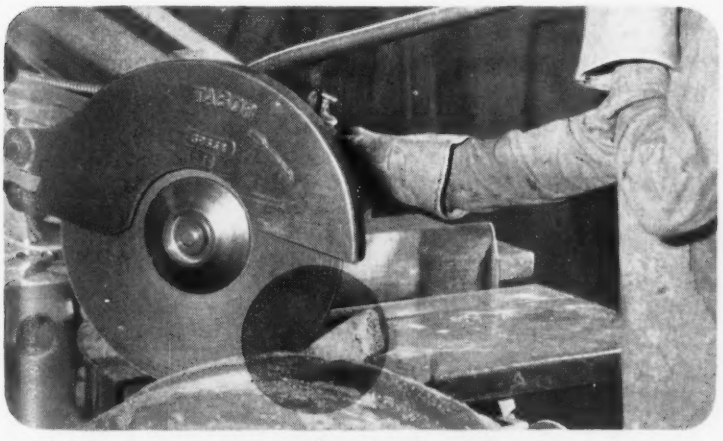
NORTON WHEELS FOR PORTABLE GRINDING are easy to use, cut fast and continuously because they have in-built balance and hug the work. They include straight and cup wheels, cones and hub wheels.

NORTON WHEELS FOR SWING FRAME WORK are made to remove a lot of metal — and fast. They're available in resinoid bond for high speed operation and BE vitrified for slow speed.

NORTON MOUNTED WHEELS AND MOUNTED POINTS are excellent for cleaning hard-to-get-at places. Available in both CRYSTOLON* and ALUNDUM* abrasives in resinoid and vitrified bonds.

NORTON ABRASIVE CORE FILES are effective and economical for touching up cores. Made of CRYSTOLON abrasive, resinoid bonded, and reinforced with steel, you'll find them lots more satisfactory than old steel files.

NORTON RUBBING BRICKS are just what you need for cleaning off sand and giving a casting a good going over. Made of CRYSTOLON abrasive they come in several grit sizes. The Norton distributor's man will suggest a good one for you.



NORTON CUT-OFF WHEELS include the Norton Type BN, *Reinforced Resinoid* Wheel shown here. Faster than band saws for cutting gates and risers, this wheel has built-in safety that assures protection against wheel breakage. The new Norton BFR *Reinforced* Hub Wheel is also handy for cutting and notching gates and risers and it does a good smoothing job as well.

NORTON

ABRASIVES

Making better products

to make other products better

W-1490

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

HERE IT IS!

The Most Economical and Efficient Release Agent Available for Shell Molding. . . . . .

FIRST IN SILICONES
DOW CORNING 8 EMULSION
SILICONE RELEASE AGENT FOR RESIN BONDED SAND SHELL MOLDS
NET WT. • LOT NO.
DOW CORNING CORPORATION MIDLAND MICHIGAN, U.S.A.

- ***Effective at lower concentrations***
- ***Gives positive release***
- ***More uniformly accurate shells***
- ***More stable, easier to use***

SPECIFICALLY designed for the shell process, Dow Corning 8 Emulsion costs less; goes further; gives positive release of more uniformly accurate shell molds. This new silicone emulsion containing 35% by weight of a special polymer is more effective at lower concentrations in water. That further reduces costs, and gives even less build-up on patterns. Dimensional accuracy is retained through longer runs; pattern-cleaning costs are substantially reduced.

Dow Corning 8 Emulsion is nonflammable, noncorrosive and highly resistant to creaming or separating in storage or after dilution with either hard or soft water. And it is available at a new low price, 8% below that of previous emulsions. For maximum efficiency at minimum cost, follow the example of major producers of shell molds and specify the new Dow Corning 8 Emulsion. See for yourself! Send coupon for FREE sample.

DOW CORNING CORPORATION, Dept. AH-5
Midland, Mich.

Please send me Free sample of Dow Corning 8 Emulsion
Data on Silicone Release Agents for the Shell Process

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Company _____

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City _____ Zone ___ State _____

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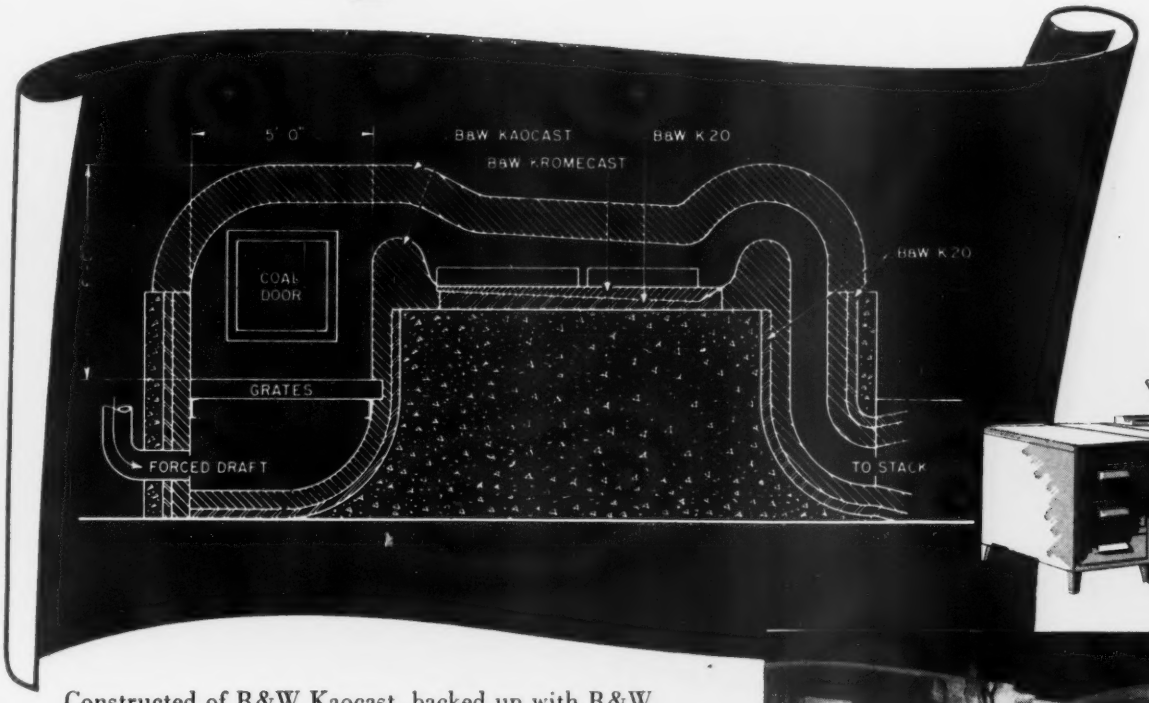
Catawissa Valve & Fittings Company

BUILDS COMPLETE FURNACE *with B&W Refractory Concretes*



Constructed of B&W Kaocast, backed up with B&W K-20 Insulating Concrete-Mix, and with a hearth of B&W Kromecast, this forge furnace had to stand up under these tough "stop-and-go" conditions:

- **Operated only 8 hours a day**
- **Shut down over week-ends**
- **Coal-fired forced draft with a pressure of 14 ounces**
- **2650 F and higher temperatures**

Heating 125 lbs of steel per square foot of hearth area per hour to a temperature of 2300 F, Catawissa found the furnace took this punishing service so well that they built another one to the same specifications.

Quality control was also improved due to the elimination of inclusions in the forged steel products.

There are good reasons for the excellent performance of these B&W Refractory Concretes. Kaocast, a 3000 degree refractory castable, has high resistance to spalling and slag attack. It offers low volume change and negligible reheat shrinkage. Versatile Kaocast can be molded quickly, easily cast directly in place or applied with a cement gun.

B&W Kromecast provides the necessary resistance to abrasion, to the effects of molten metal, and to slag attack which are so necessary for a forge furnace hearth. The insulating properties of B&W K-20 Insulating Concrete-Mix protect the exterior ordinary concrete lining and hold temperatures down to such an extent that the outside of the furnace can be touched with a bare hand.

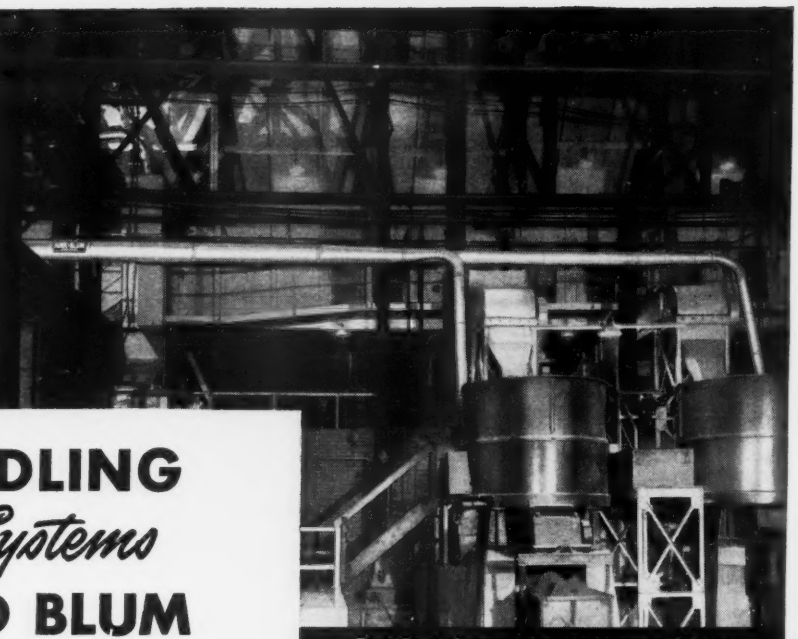
These are some of the reasons why B&W Refractory Concretes are being used in so many thousands of applications. Whether you need a whole furnace lining or small special shapes, it pays to investigate B&W Refractory Concretes.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS: B&W ALLMUL FIREBRICK • B&W 80 FIREBRICK • B&W JUNIOR FIREBRICK
B&W INSULATING FIREBRICK • B&W REFRACTORY CASTABLES, PLASTICS AND MORTARS

R-431



Dust Control connections to Simpson Mixers in right foreground.

SAND HANDLING
Dust Control Systems
by KIRK AND BLUM

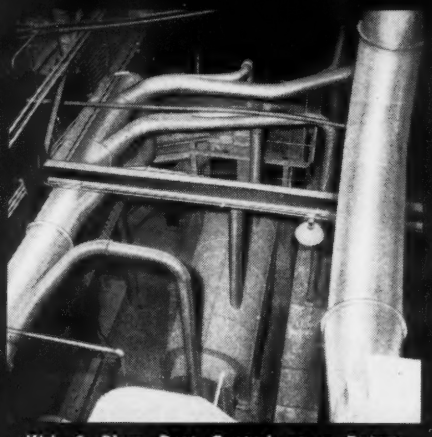
Dust is efficiently removed in the sand handling department of a large well-known steel foundry . . . as illustrated in these photos of a typical KIRK & BLUM Foundry Dust Control System.

One of many KIRK & BLUM foundry applications, this installation meets every requirement of the American Foundryman's Association code; heavy gauge piping has flanged joints and convenient clean-out doors.

Don't let dust foul up expanding production plans. Whether you need a new dust control system . . . or more capacity in an existing one . . . contact KIRK & BLUM, specialists in dust and fume control for more than 46 years. They'll gladly prove the money-saving efficiency of KIRK & BLUM dust control systems.

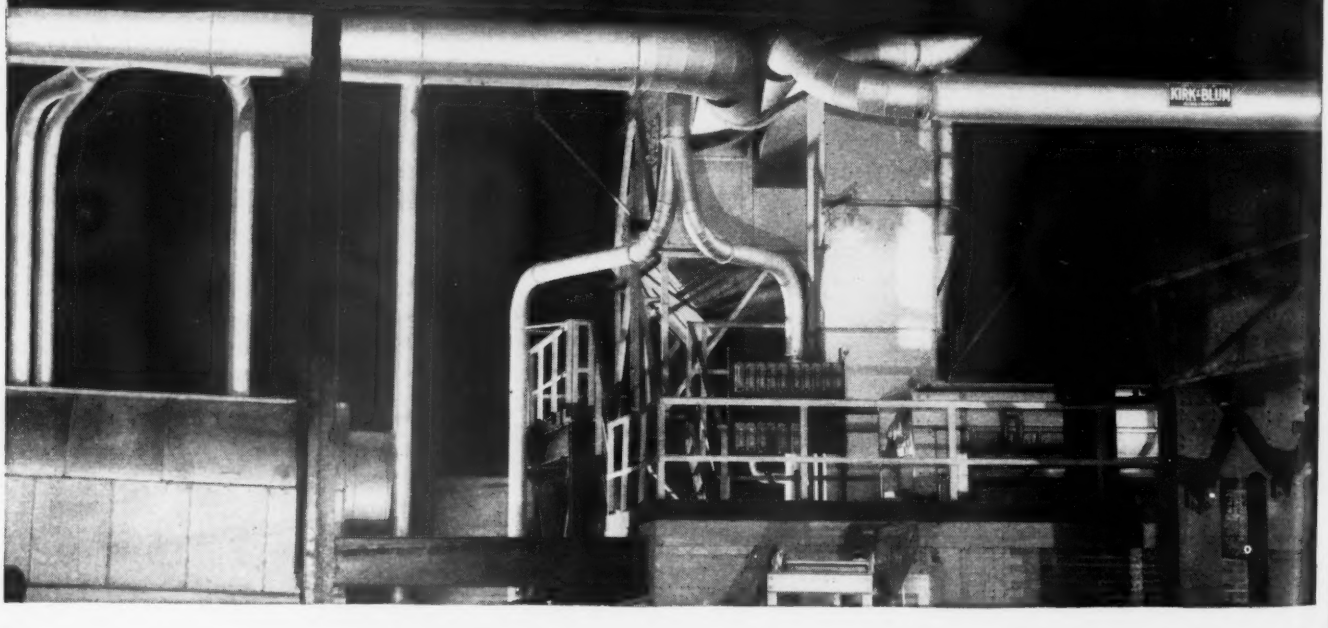
For informative booklet, write: The Kirk & Blum Mfg. Company, 3108 Forrer St., Cincinnati 9, Ohio.

FOR CLEAN AIR . . . THE INVISIBLE TOOL **KIRK AND BLUM** DUST CONTROL SYSTEMS



Kirk & Blum Dust Control on a Rotary Breaker Screen.

View of sand handling equipment with rotary breaker screen on the left.



Desand-degraphitize castings in 10 minutes with VIRGO® MOLTEN CLEANER

UNLOADING VIRGO-CLEANED CASTINGS from continuous cleaning line.

HERE ARE THE BENEFITS!

- **Longer machine tool life.**
- **All surface defects show up.**
- **A cleaner, better product.**

With Virgo Molten Cleaner your castings are completely free from sand and graphite before they are machined, giving you greater machine tool life. Any surface defects on castings are shown up, and you can scrap defective castings before they are machined. This same freedom from impurities insures trouble-free operation for your product when it is placed in use.

The process is simple and easy to operate—does not require close supervision. A five-minute immersion of castings in Virgo Molten Cleaner bath at 800° F. is usually enough to dissolve every trace of sand, and dissolve graphite to satisfactory depth. A water quench removes salt and leaves a protective coating on the castings. (This coating is corrosion-resistant and may be left on if castings are to be stored.) The coating is removed by a three-minute dip in dilute acid. A brief water hosing or rinse completes the job.

You can use the Virgo bath, at higher temperature, to stress relieve while desanding. By combining operations in this way, costly annealing equipment, as well as the additional operation can be eliminated.

For full details and description of this process, write us today. Please use your business letterhead or coupon below.

For Fast, Safe, Low-Cost DESCALING— VIRGO® DESCALING SALT

Producers and fabricators of stainless and alloy steels use Virgo Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing. The Hooker Process is backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS

They tell the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.

HOOKER CHEMICALS ®

1-1949

From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY

20 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
NEW YORK, N. Y.
LOS ANGELES, CALIF.
TACOMA, WASH.
CHICAGO, ILL.

Hooker Electrochemical Company

20 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

Please send me Bulletins checked: Virgo Descaling Salt ☐ Virgo Molten Cleaner ☐

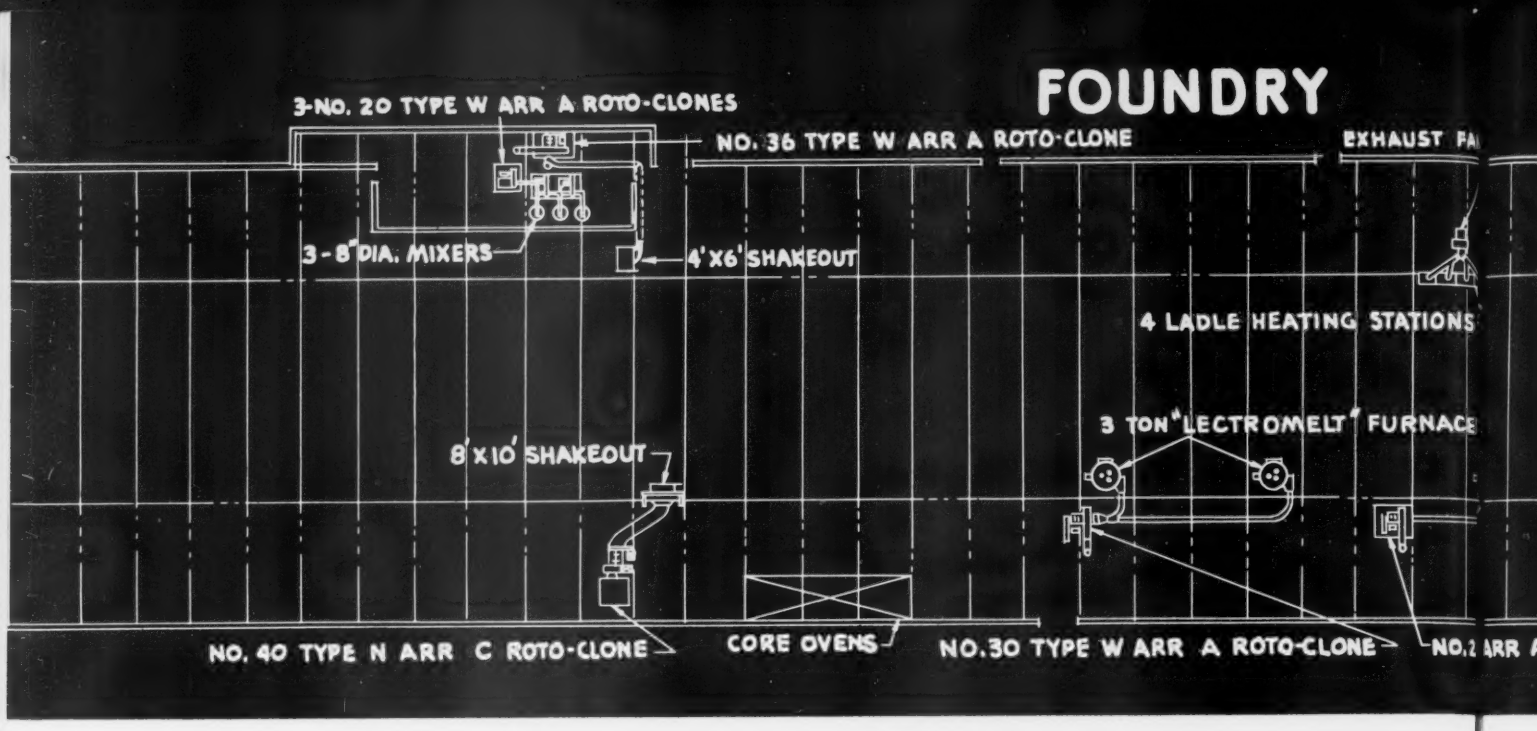
NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE ____

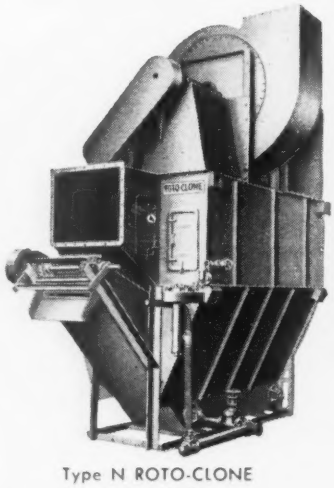

FOUNDRY
3-NO. 20 TYPE W ARR A ROTO-CLONES
NO. 36 TYPE W ARR A ROTO-CLONE
EXHAUST FA
3-8' DIA. MIXERS
4'X6' SHAKEOUT
4 LADLE HEATING STATIONS
3 TON "LECTROMELT" FURNACE
8'X10' SHAKEOUT
NO. 40 TYPE N ARR C ROTO-CLONE
CORE OVENS
NO. 30 TYPE W ARR A ROTO-CLONE

16 ROTO-CLONES at M

COLLECT 17,400 LBS. OF DUST PE

Complete ROTO-CLONE Line Used For "A to Z" Dust-Control Service At Maynard Electric Steel Castings, Milwaukee, Wisconsin

Operation	ROTO-CLONE	CFM
New Sand System	1—24 Type W Arr. A with Skimmer Precleaner	14,590
Wheelabrators—48"x 48" & 42"x48"	1—6 Type N Arr. C	6,305
Wheelabrator—48"x 72" & 2 Tumbling Mills	1—8 Type N Arr. C	7,830
3—Blast Rooms	3—Type N Arr. C	33,780
6—Swing Frame Grinders	2—24 Type D	27,850
2—Snag Grinders & Cutoff Saw	1—16 Type D with Skimmer Precleaner	4,900
Total	9 ROTO-CLONES	95,255

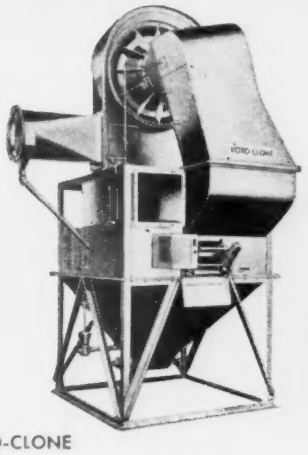


Type N ROTO-CLONE
Arrangement C

Type D ROTO-CLONE
With Skimmer Precleaner

13' X 15' BLASTRO
48" X 48" WHEELABRATOR
42" X 48" WHEELABRATOR
NO. 6 TYPE N ARR C ROTO-CLONE
NO. 15 TYPE N ARR C ROTO-CLONE
NO. 12 TYPE N ARR C ROTO-CLONE

Operation	ROTO-CLONE	Total CFM
Electric Furnaces	1—27 Type W Arr. A	6,110
	1—30 Type W Arr. A	16,900
Shakeout, 4'x6'	1—36 Type W Arr. C	25,050
Shakeout, 8'x10'	1—40 Type N Arr. C	41,000
Sand Mixers	3—20 Type W Arr. A	21,900
Total	7 ROTO-CLONES	110,950



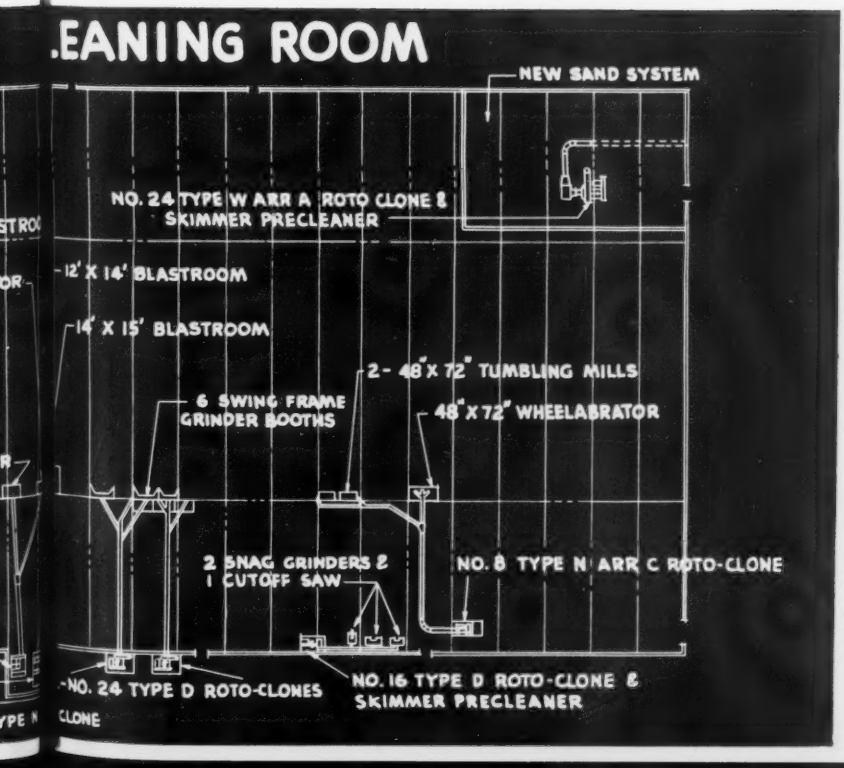
Type W ROTO-CLONE
Arrangement C

Type W ROTO-CLONE
Arrangement A

t Maynard
T PER DAY

Here's a case history that brings you the ROTO-CLONE* story in a "nutshell". Sixteen units, representing the complete ROTO-CLONE line, were installed at Maynard over the five-year period 1944 through 1948. From time of installation to date, all units have operated on a 3-shift basis—that's 4 to 8 years of continuous, heavy-duty service. Parts replacement resulting from this 24-hour grind? Practically nil! **13 of the 16 ROTO-CLONES have had no parts replacement except for sludge ejector sprockets and chains.**

If you have dust problems, your local AAF representative is ready with the right answers. Call him or write us direct.


.EANING ROOM
NEW SAND SYSTEM
NO. 24 TYPE W ARR A ROTO CLONE & SKIMMER PRECLEANER
12' X 14' BLASTROOM
14' X 15' BLASTROOM
2- 48"X 72" TUMBLING MILLS
6 SWING FRAME GRINDER BOOTHS
48"X 72" WHEELABRATOR
2 SNAG GRINDERS & 1 CUTOFF SAW
NO. 8 TYPE N ARR C ROTO-CLONE
NO. 24 TYPE D ROTO-CLONES
NO. 16 TYPE D ROTO-CLONE & SKIMMER PRECLEANER

You Can Expect the Best From

American Air Filter
COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

**ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

Here is the NEW

NEW foundry SAND for OLD with PNEUMATIC RECLAMATION

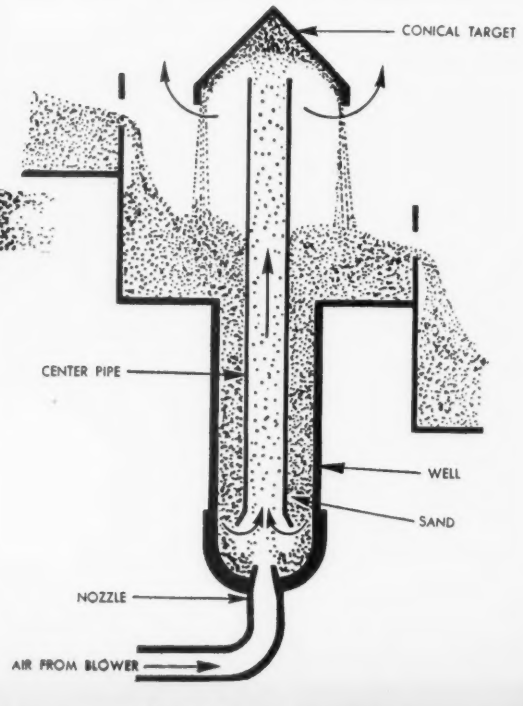
The need for Sand Reclamation

Most foundries have experimented with repeated reuse of their sand in an effort to overcome the expensive and wasteful necessity of disposing of used sand. All have found a point is quickly reached where a savings in sand cannot offset increased losses in production and cleaning operations. Sand grains soon become encased in shells of old bond. These "pickle" grains decrease flowability until the sand is no longer within a workable range.

Many reclaiming methods have been proposed and tried but few have been successful. The NATIONAL Sand Recovery System is the first *truly* practical method for affording controlled, economically sound reclamation of foundry sands.

HERE'S HOW IT WORKS...

The NATIONAL Recovery Unit is comprised of a variable number of scrubbing cells. A turbine type blower supplies a high velocity air stream to hurl the air/sand mass upward through a vertical center pipe. Colliding with other grains within the peak of the conical skirted deflector individual sand grains themselves act as the abrasive body. The grains fall back to the main sand mass while the motivating air escapes upward carrying fines and air floatable particles of "shell" out the exhaust. Control of reclamation is maintained by adjusting the feed rate . . . elimination of fines is controlled by the exhaust velocity.



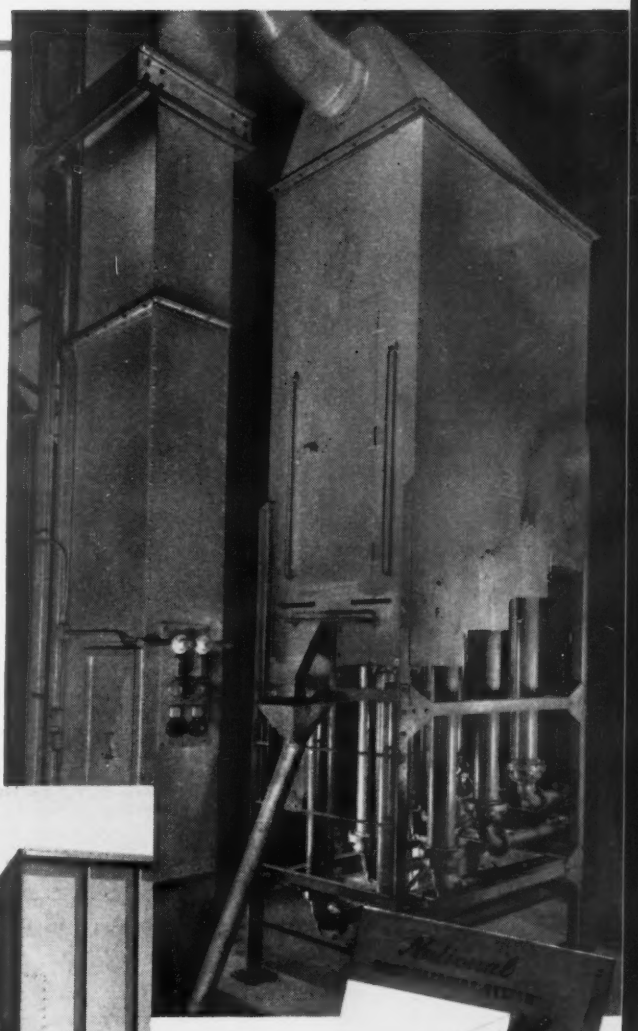
NATIONAL SAND RECOVERY SYSTEM

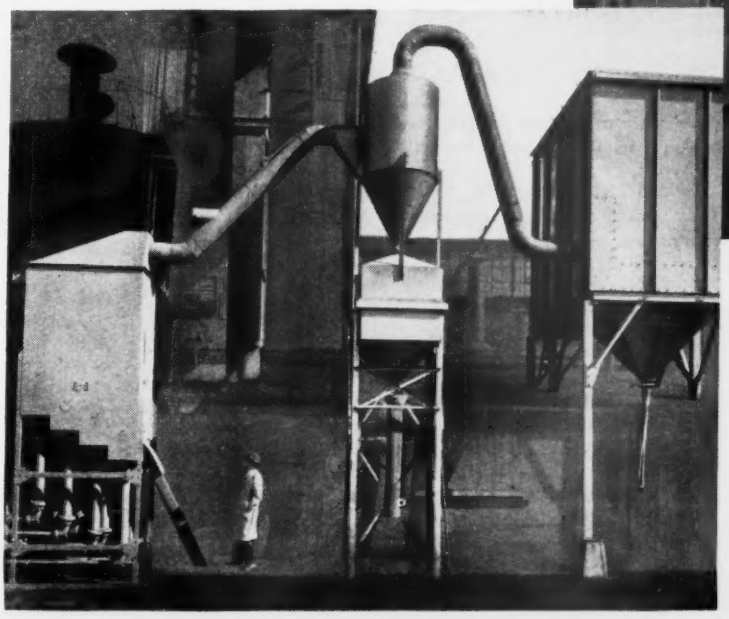
NEW PROFITS from your SAND DUMP

Used or "burnt out" sand—long idle . . . never before usable and certainly a major handling and storage expense, can become a new sand supply source through use of the NATIONAL System.

A typical sand reclaiming system would consist of a Vibrating Conveyor and Screen, Surge Bin, Vibrating Feeder and NATIONAL Sand Scrubber. Limited space requirements . . . complete operational and construction simplicity . . . little or *no* additional man power demand—all combine with low initial cost and immeasurable return on investment to make the NATIONAL Recovery System well worth *your* consideration.

Foundry tested and proved, reports on the NATIONAL Sand Recovery System have indicated no limitation on the type, usage or grades of sand that can be pneumatically reclaimed. One customer reports that a single NATIONAL Unit is *saving* them better than $700.00 per *day*.





The view above, right, is of an interior installation of a National Sand Scrubber showing the Sand Elevator at left and Sand Scrubber discharge chute at lower center. At the right is a typical exterior installation showing National Sand Scrubber, fines collector and dust collector.

Write for Bulletin 512 for the complete story on the new NATIONAL Sand Recovery System.

National Engineering Company
(Not Inc.)
608 Machinery Hall Bldg. • Chicago 6, Illinois

SIMPSON *Intensive* MIX-MULLERS

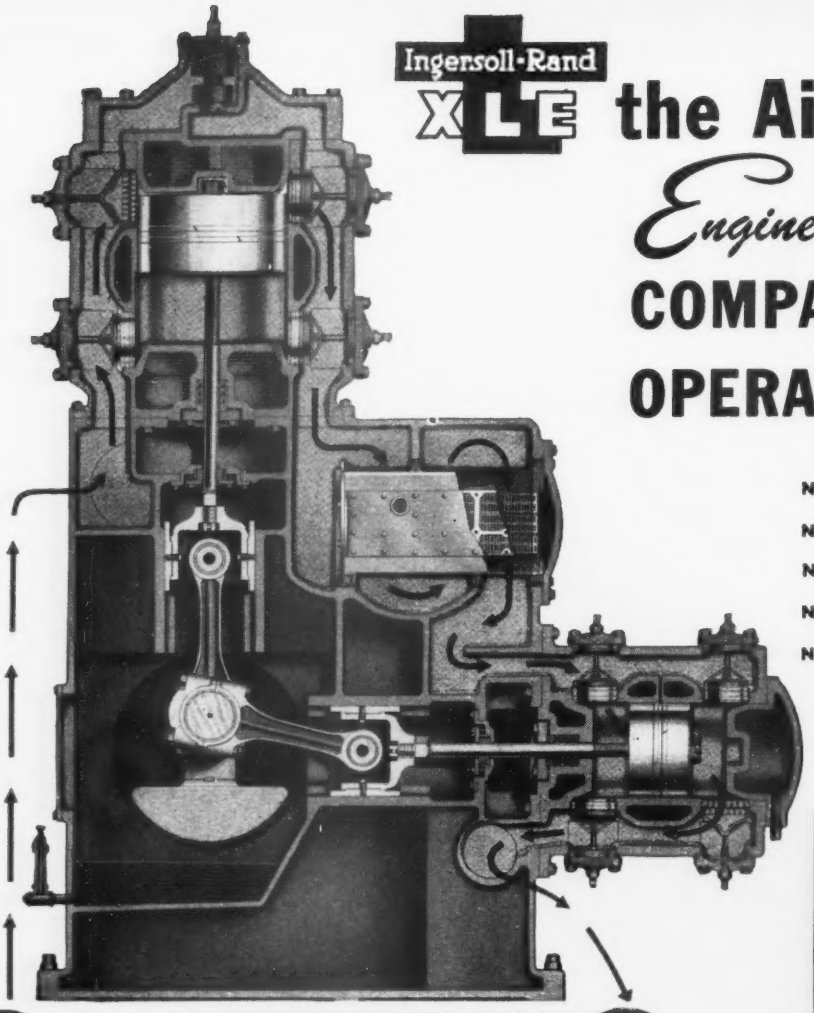
Product of a Practical Foundryman

Ingersoll-Rand

XLE the Air Compressor

Engineered for

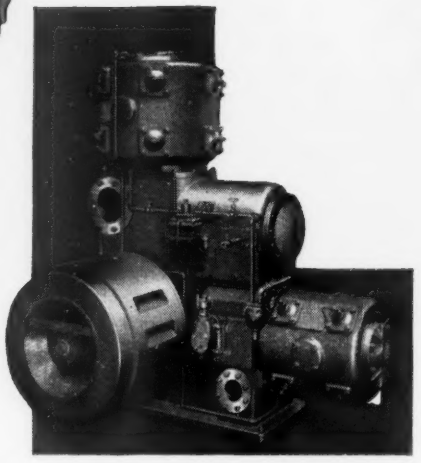
COMPACTNESS AND OPERATING ECONOMY



NEW *Air Flow* DESIGN
NEW *Intercooler* DESIGN
NEW *Cylinder* DESIGN
NEW *Frame and Running Gear* DESIGN
NEW L DESIGN

PIPELESS THRU-FRAME AIR FLOW

Main air connections on the compressor frame eliminate piping strain from the cylinders. Air flow between these two points is entirely within the frame and cylinders. There is no interstage piping. The streamlined frame houses the intercooler and combined with the wide-flanged cylinders provides a sturdy construction that maintains alignment.



Packaged design for minimum floor space, and specially balanced for minimum foundation . . . ideal for skid-mounting.

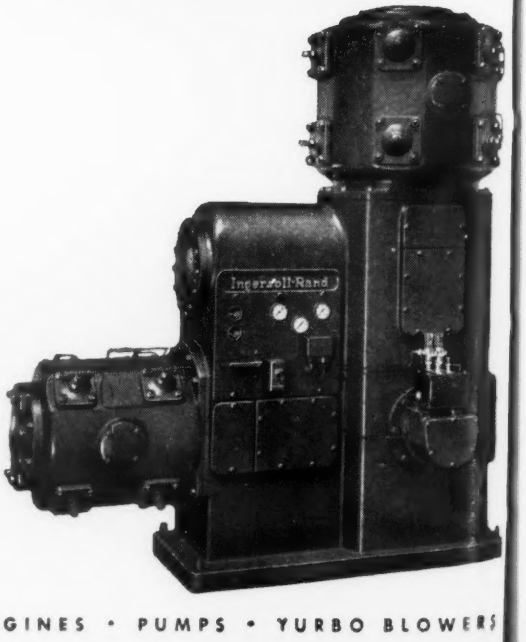
Easy to operate . . . push button starting, grouped controls, automatic force-feed lubrication, automatic condensate removal, automatic air-operated starting unloaders and capacity control.

Easy to install or relocate . . . ready-to-run, assembled shipment . . . simplified air and water piping.

Easy to maintain . . . simplified long-life construction . . . full-floating, cool-running, aluminum-alloy bearings that require no adjustment . . . no need to open the sealed crankcase which stays clean inside . . . streamlined exterior also easy to keep clean.

Low operating costs . . . new high-efficiency, long-life I-R Channel Valves result in compressor efficiency comparable to the largest units . . . durable, high-efficiency tube-and-fin intercooler saves water . . . efficient direct-connected motor.

Built for reliable, continuous full-load service . . . sizes 125, 150, 200, 250, 300, 350 horsepower . . . discharge pressures 80 to 125-psi, two stage . . . write for more information today.



Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 688-1

ROCK DRILLS • AIR & ELECTRIC TOOLS • OIL & GAS ENGINES • PUMPS • YURBO BLOWERS

On heavy duty service in a big automotive parts foundry, this Norton CRYSTOLON* slag hole block is one of many similar installations now helping to step up metal melting production throughout industry.

Up to 64 hours continuous operation with Norton slag hole blocks

Extra long service life is a big, cost-cutting advantage you get with Norton CRYSTOLON slag hole blocks. That's why they've gained such wide acceptance throughout the metal melting field, users reporting up to 64 hours operation without shutdown, under severest back slagging conditions.

Built For High Production

Made of hard, dense silicon carbide, CRYSTOLON blocks stubbornly resist corrosion and erosion of acid or neutral slags. They'll withstand the abrasive action of flames and hot gases at temperatures up to 3050°F., without spalling, cracking or loading. They'll last you approximately five times longer than fire clay, under similar conditions, and their ability to stand up without constant repair or attention will make a big hit with your melting foremen.

With these proved qualities for longer, more efficient service life working for you, Norton blocks can be an important factor in increasing your output of vitally needed metals — while saving you time, trouble and money.

Shapes To Meet Your Needs

We are now producing the widest variety of CRYSTOLON block shapes, covering the range of foundry requirements. For further information, including prices, on exactly the right blocks to cut your costs and boost production, see your nearby Norton representative. Or write direct to NORTON COMPANY, 304 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

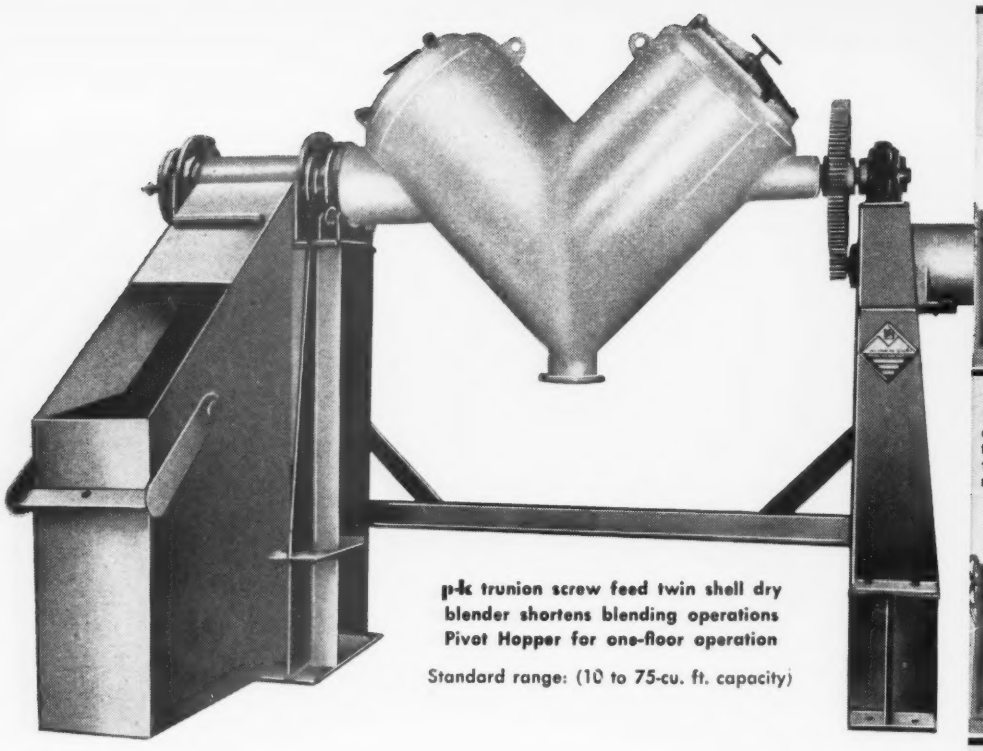
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

Special REFRACTORIES

Making better products to make other products better

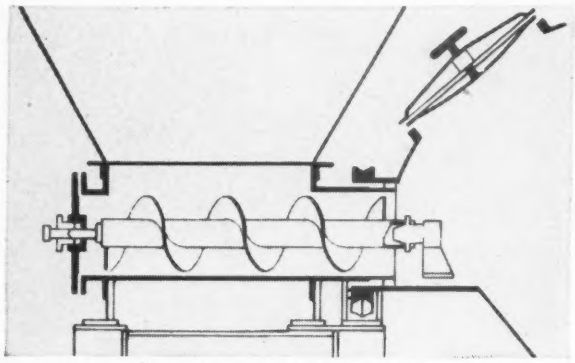
NORTON COMPANY, WORCESTER 6, MASSACHUSETTS



p-k trunion screw feed twin shell dry blender shortens blending operations Pivot Hopper for one-floor operation

Standard range: (10 to 75-cu. ft. capacity)

Now! Dry blending is even faster



p-k trunion screw feed fixed hopper for conveyor or through-floor operation

Standard range: (10 to 150-cu. ft. capacity)

The new **p-k** trunion-feed, twin shell dry blender is faster because: Hopper can be loaded while blending is in progress permitting semi-continuous operation which speeds up the overall blending process. The blender is loaded directly from the hopper by a short, screw conveyor in a fraction of the time formerly required. All internal surfaces — shell, hopper and screw are quickly accessible for cleaning.

Gentle rolling-folding action assures rapid blending of sands and resins vital to the shell molding process, thoroughly and without attrition.

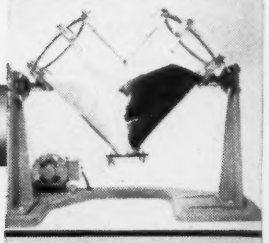
Dust tight loading ports eliminate dusting which results in a clean operation. All interior surfaces are baffle-free and are easily reached for thorough cleaning.

Simply designed for better blending.

When your process planning includes a blending operation, it will pay you to ask **p-k** for blending tests on your materials and for engineering assistance at the initial planning stage. Since **p-k** also makes double-cone and ribbon blenders, an unbiased analysis of your blending methods is assured. Or, write for factual literature—Catalog No. 12. ⊕1901-B

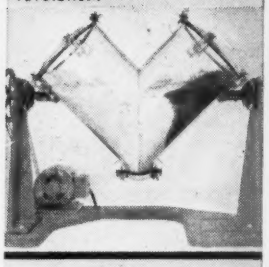
LOAD

As this typical test illustrates, the effectiveness of this new blending principle assures a thorough blend in minutes.



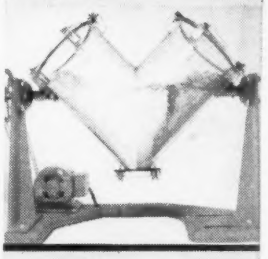
1st REV.

The gentle rolling, folding, dividing and combining action with a simultaneous cross flow can be seen in the first revolution.



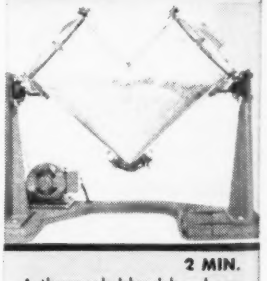
5th REV.

End-to-end dispersion and intimate mixing becomes evident. This is true regardless of particle size, form or density.



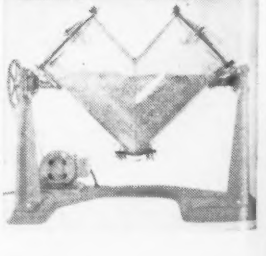
1 MIN.

The mass rotates close to the axis and does not require rapid rotation. Neither separation nor attrition takes place.



2 MIN.

A thorough blend has been achieved. Laboratory or pilot plant blender illustrated is available in 4- and 8-quart sizes.



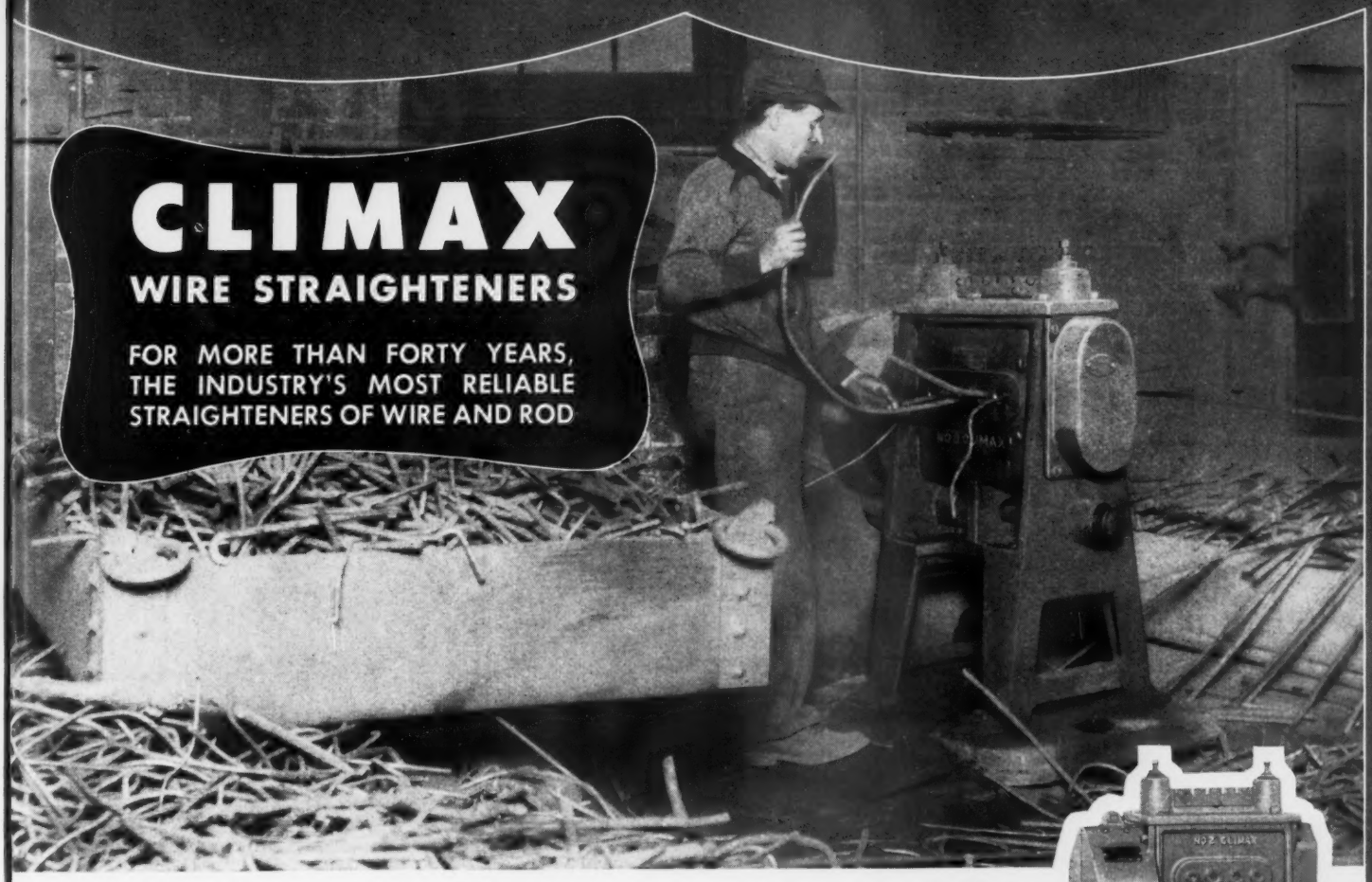
the **Patterson-Kelley Co.,** *Inc.*

1350 Lackawanna Ave., East Stroudsburg, Penna.

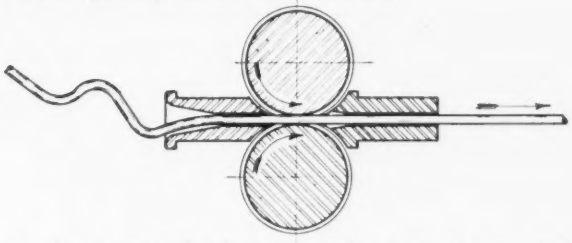
101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities

CLIMAX
WIRE STRAIGHTENERS

FOR MORE THAN FORTY YEARS, THE INDUSTRY'S MOST RELIABLE STRAIGHTENERS OF WIRE AND ROD

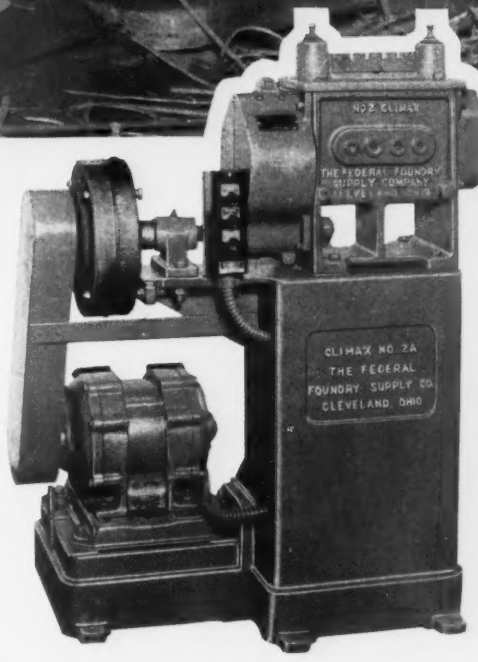


Reclaim your used core rods and wires and save money—with the CLIMAX. Operated safely and efficiently by unskilled labor. Straightens random lengths quickly and economically.



Bent wire is first checked in guide slots at top of the machine to determine proper feed hole, then inserted in feed hole, straightened between two heavy, alloy steel rolls under spring tension and ejected at back with a slight, natural bend, just right for core rod use.

Safety for the operator, as well as long life for the machine, is insured by enclosing gears and other moving parts. On motorized units, V-belts are enclosed and electrical wiring protected. Conveniently mounted controls and a reversible magnetic switch provide full protection for operator and straightening rolls, by enabling operator to stop or reverse machine instantly.



MODEL 2A
motorized

Handles 4 wire sizes, 1/16" to 1/4". A complete unit, ready for operation when connected to current supply.

MODELS AVAILABLE

The CLIMAX is offered in three sizes: to handle 4 wire sizes from 1/16" to 1/4"—4 sizes from 3/16" to 1/2"—and 5 sizes from 1/4" to 3/4". Each size may be furnished in three styles, as follows:

(1) Completely motorized—ready to operate.
(2) With gear reduction unit for your motor.
(3) With extended shaft for your own drive.

Write for additional information and prices, specifying wire sizes and model style.

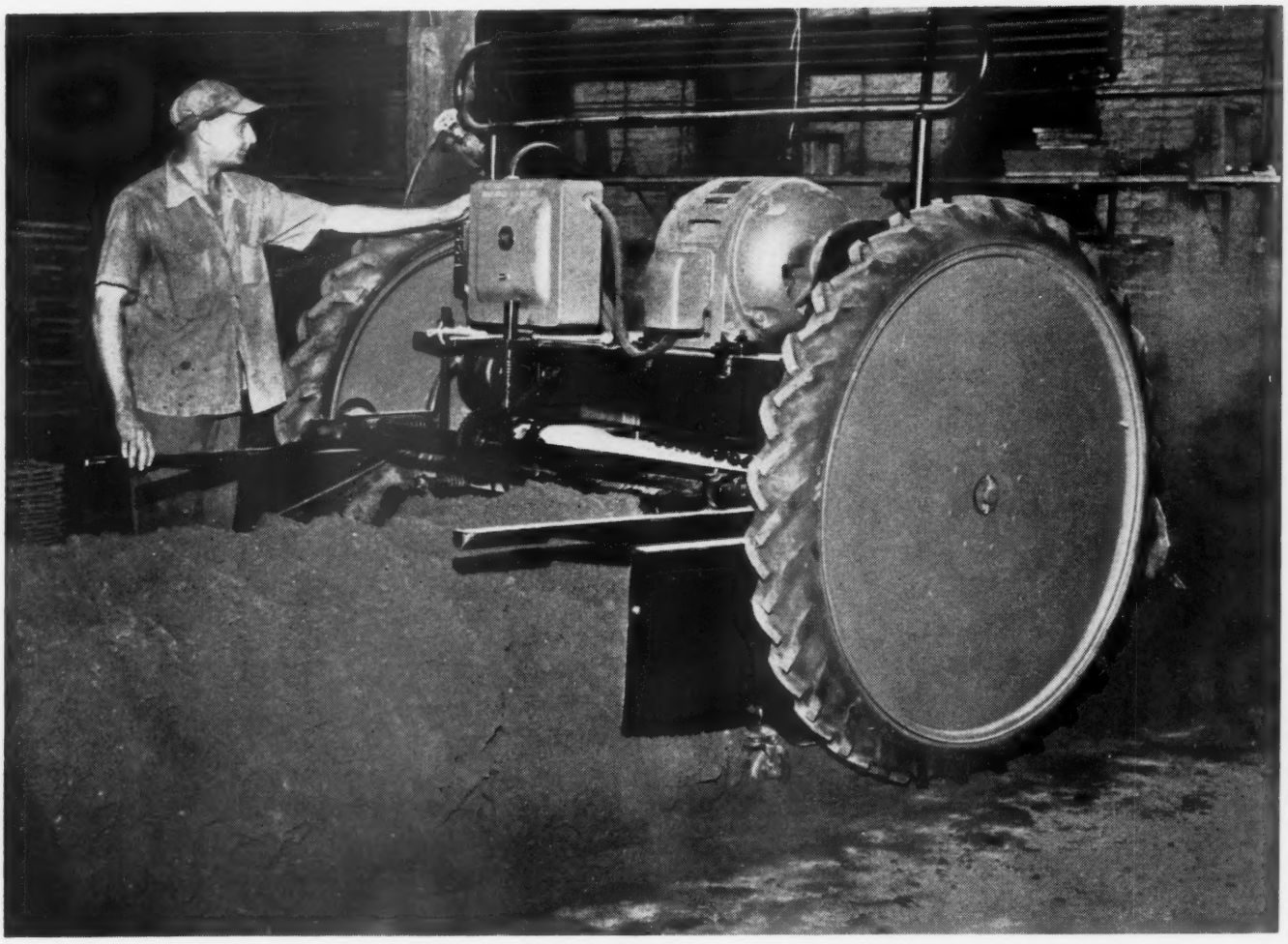
FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. · CHICAGO · CHATTANOOGA · DETROIT · MILWAUKEE · NEW YORK · RICHMOND · LOS ANGELES · UPTON, WYO.

The New Moulders' Friend
FINDS FRIENDS EVERYWHERE



MOULDERS like The New Moulders' Friend sand conditioner, because the blending action of the rotary wire brush thoroughly mixes and aerates the sand, making it easier to put up more and better molds.

NIGHT CREWS like it, because it eliminates much manual labor and does a better job of conditioning the sand. With this completely self-propelled machine one man can condition more than two tons of sand per minute.

SAND CONTROL MEN like it, because it does such a thorough job of mixing, moistening and screening that they really can control the sand.

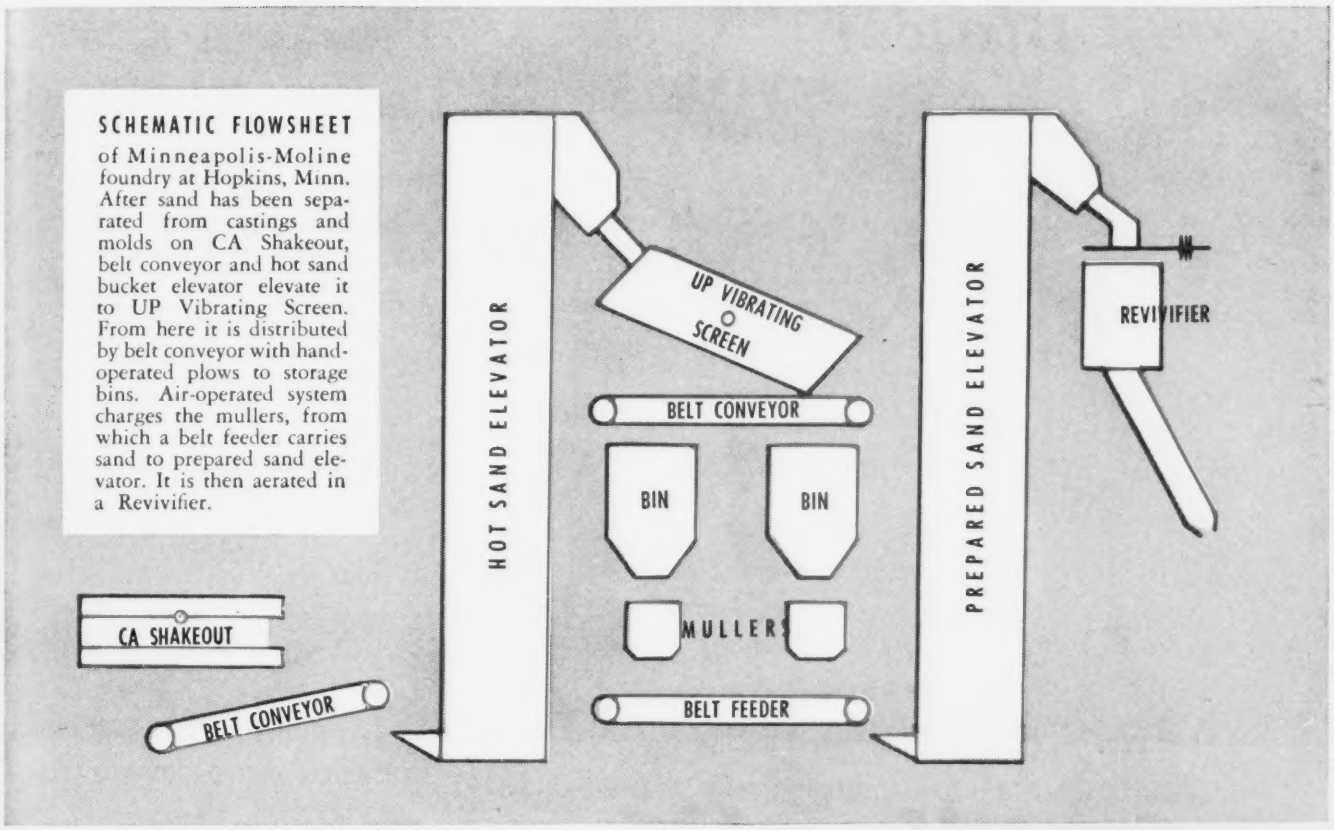
MAINTENANCE MEN like it, because it has few moving parts to keep in order.

YOU will like The New Moulders' Friend, because it pays for itself quickly with better castings and labor saved.

Investigate The Moulders' Friend today. See one in operation.

"The Moulders' Friend" **— — Dallas City, Illinois**

LINK-BELT mechanizes sand handling for Minneapolis-Moline

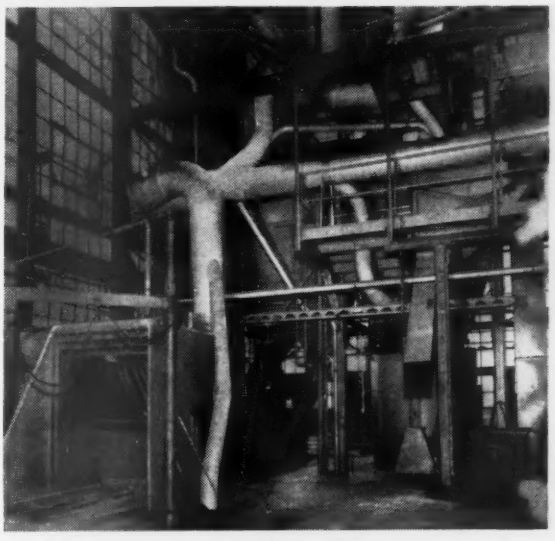

SCHEMATIC FLOWSHEET
of Minneapolis-Moline foundry at Hopkins, Minn. After sand has been separated from castings and molds on CA Shakeout, belt conveyor and hot sand bucket elevator elevate it to UP Vibrating Screen. From here it is distributed by belt conveyor with hand-operated plows to storage bins. Air-operated system charges the mullers, from which a belt feeder carries sand to prepared sand elevator. It is then aerated in a Revivifier.
CA SHAKEOUT
BELT CONVEYOR
HOT SAND ELEVATOR
UP VIBRATING SCREEN
BELT CONVEYOR
BIN
BIN
MULLERS
BELT FEEDER
PREPARED SAND ELEVATOR
REVIVIFIER

Modern system saves floor space, increases worker productivity, improves working conditions

WHEN Minneapolis-Moline Company wanted to mechanize the sand handling in the heavy casting area of their Hopkins (Minn.) foundry, they again called on Link-Belt. Several years earlier Link-Belt had solved a similar problem for them in an adjacent area.

Now, from the time molds reach centralized shakeout—until aerated sand is ready for the molders—everything moves mechanically . . . smoothly. Complete dust-collection system and elevated bins keep the floor clean and the air clear. Ample provision has been made for future expansion and further mechanization within the limits of present floor space. It's easy to see why Minneapolis-Moline recently awarded Link-Belt the contract for an even larger foundry mechanization project at another plant.

Don't pay a penalty for outmoded foundry handling. Chances are, mechanization by Link-Belt will more than pay for itself in a short time by boosting output . . . cutting operating costs . . . increasing worker productivity. A Link-Belt foundry engineer will be glad to talk it over with you. Just call the Link-Belt office near you today.

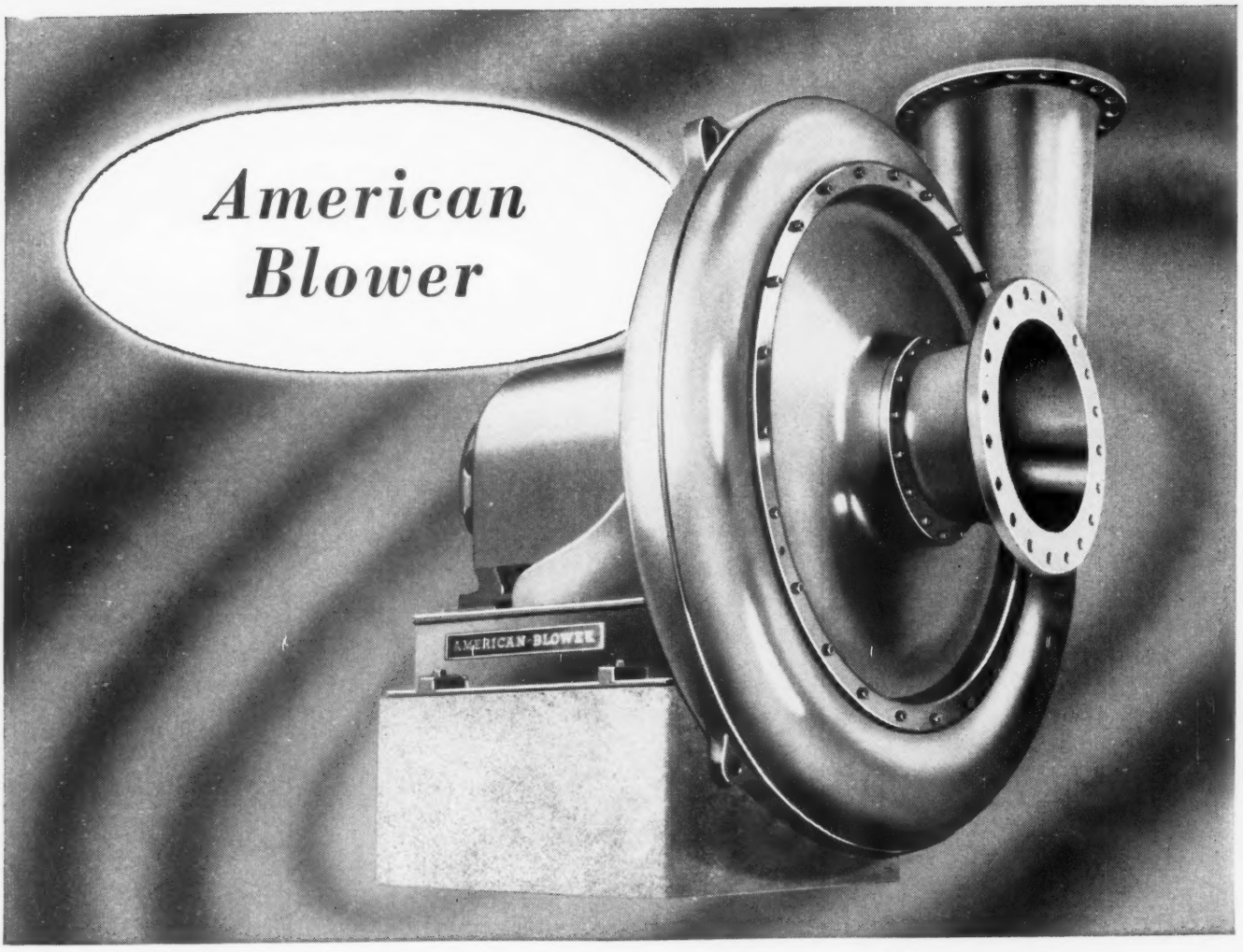


LINK-BELT

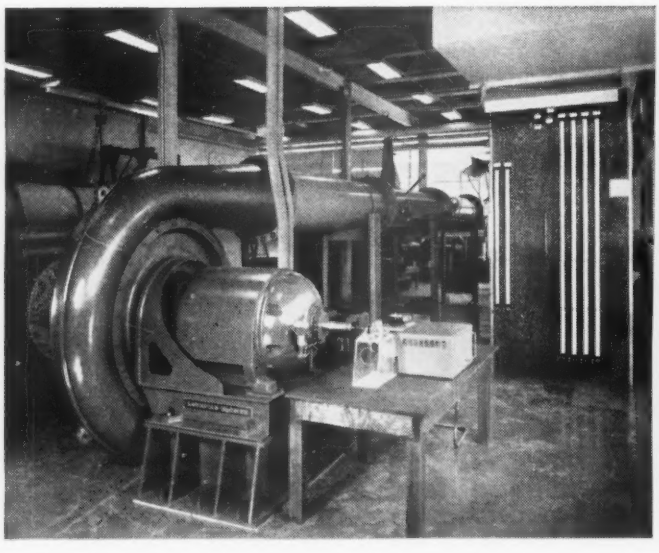
CONVEYORS AND PREPARATION MACHINERY

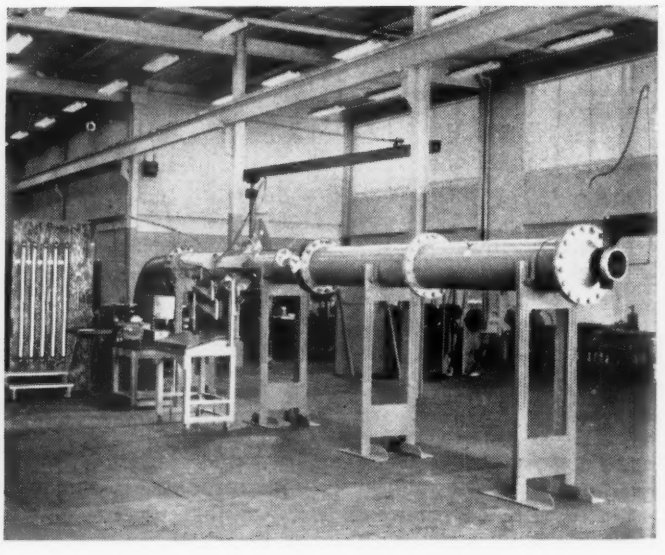
MEMBER FEMA

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities. 13,140



Centrifugal Compressors





Prior to shipment, each compressor is thoroughly tested for mechanical and performance characteristics in accordance with the A.S.M.E. Power Test Code in American Blower's modern research and testing laboratory.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS

They're compact, require minimum foundations, are adaptable to all types of drives

Use Them Profitably for These Jobs

AIR COMPRESSION
ANNEALING FURNACES
CATALYST REGENERATORS
COAL PULVERIZATION
CUPOLAS
CYCLONE FURNACES
FORGING FURNACES
GAS BOOSTERS AND EXHAUSTERS
LEAD AND COPPER FLOTATION
PNEUMATIC CONVEYING
OIL-GAS GENERATORS
PLANT PRESSURIZING
SINTERING
WATER-GAS GENERATORS

American Blower Single Stage Centrifugal Compressors are basically variable-volume, constant pressure compressors, built to deliver efficiently large volumes of air or gases at high pressures.

You can buy them in sizes from 30 to 600 HP with pressures from 1¼ to 3¾ lbs. In addition, any American Blower Centrifugal Compressor can be equipped with controls to meet specific job requirements — such as constant inlet volume, constant suction pressure, constant discharge pressure, or constant weight flow.

For technical data, consult the nearest American Blower Branch Office or write us for Bulletin 109.

Whether you need equipment for heating, cooling, ventilating, air conditioning, vapor absorption, fume removal, dust collecting, mechanical draft, heat transfer or smooth power transmission thru Gyrol Fluid Drives — American Blower manufactures a complete line of products to meet your requirements. Helpful technical literature is available on each product.

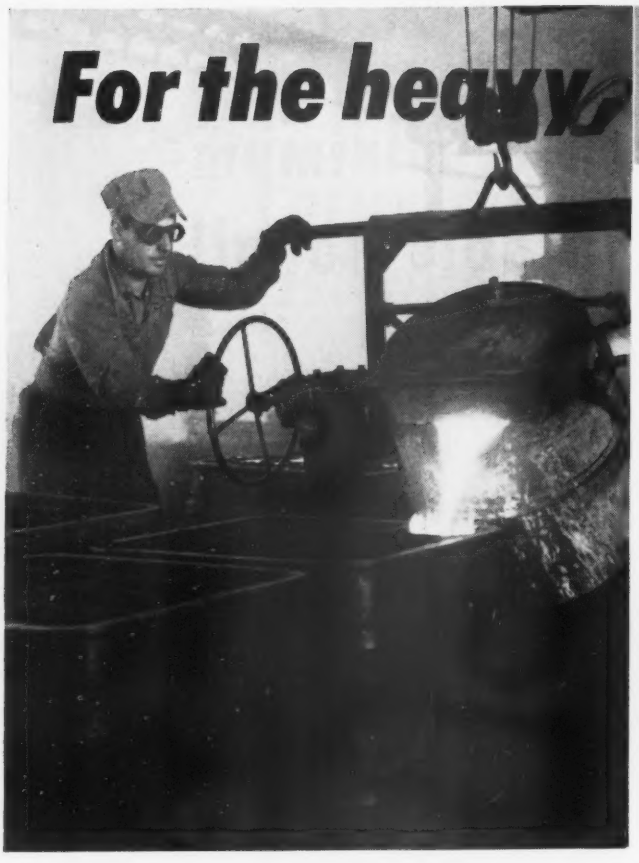
AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

& WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

For the heavy tough jobs...



200 Foundries Have Converted to BS&B HEAVY DUTY Foundry Flasks

Like any BS&B Foundry Flask, the Heavy Duty is tailor made . . . designed for your particular needs . . . designed to do the best job for you. This is what 200 major foundries have found who have converted to them in the last 15 years.

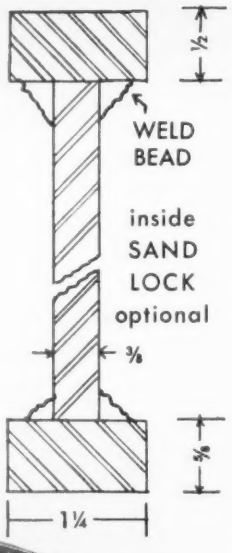
Only BS&B gives you all three of these features in a heavy duty flask—bearing strips welded both inside and out, cast steel trunnions, and cast steel pinlugs and clamplugs. In addition, it's the only flask offering a minimum of weight for easy handling, considering the material used to give it the greatest rigidity. These 200 foundries who have converted to the BS&B Heavy Duty Flask have recognized the economy of having the best equipment for the job . . . of enjoying minimum maintenance and replacement as the years pass.

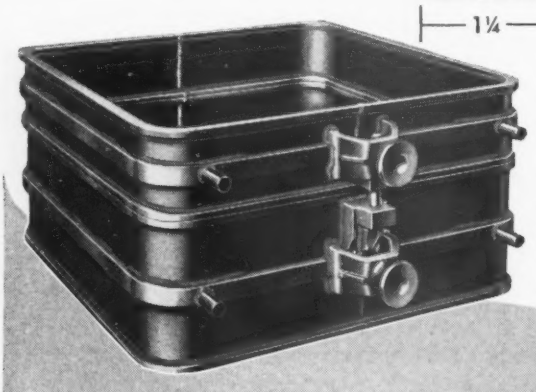
BS&B Foundry Flasks are designed by foundrymen . . . fabricated by skilled workmen using quality materials. They're constructed entirely of steel . . . sections surface ground, or machined both top and bottom, for tight joint at parting line. You, too, will profit from the many advantages of this heavy duty flask. Write for your FREE copy of the BS&B Foundry Flask Handbook.

Foundry Flask Division
Dept. 7-AR5

Cross Section of Style FP 22
showing wall thickness, bearing bar size and welding. The reinforcing rib is optional, and is designated as Style FP 22R.

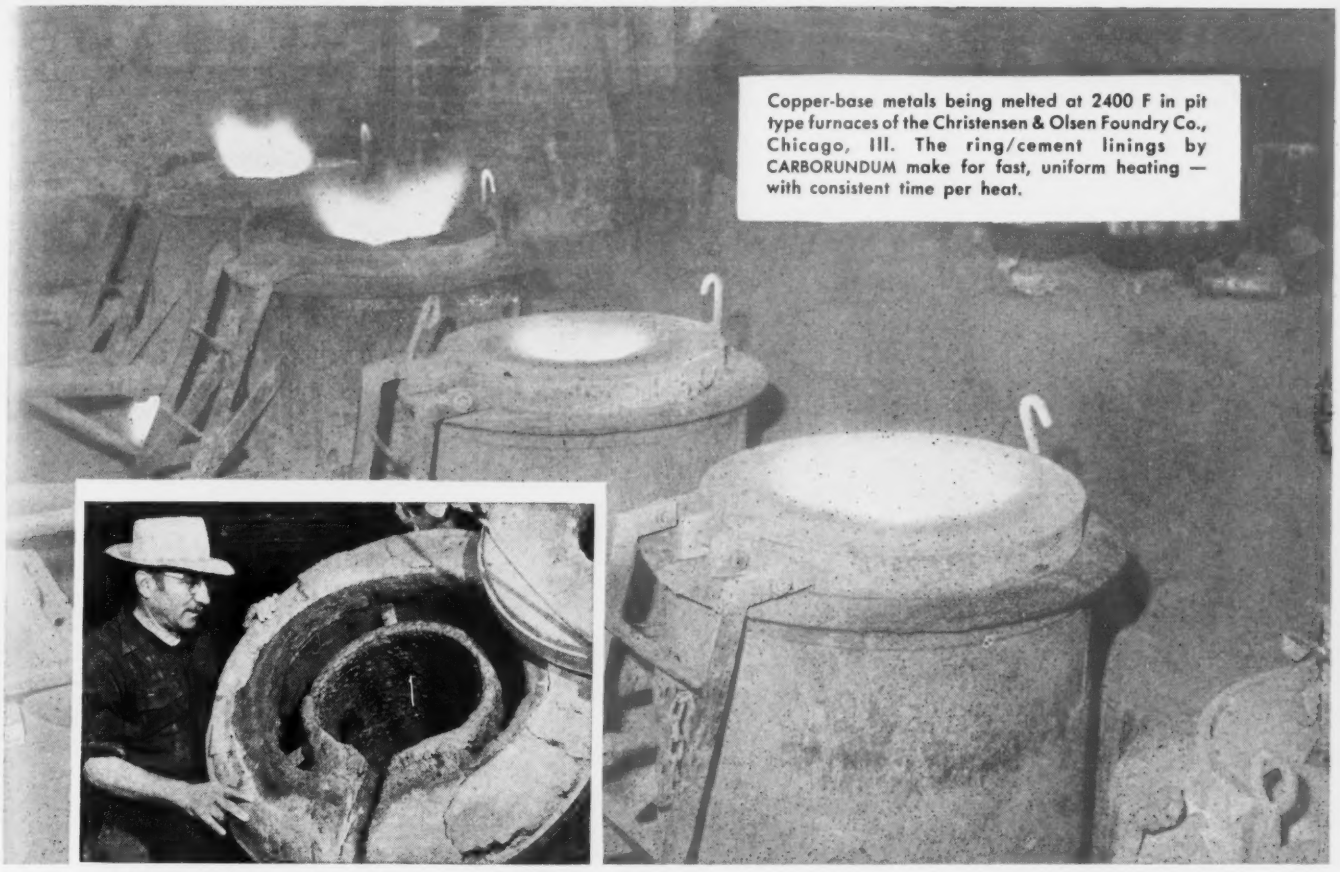
BS&B Heavy Duty Flask Style FP 22R
has solid bar reinforcing rib wherever required, particularly on large or deep sections. Like all BS&B Foundry Flasks, this style is available in round, square, rectangular and special shapes. Thickness of wall, size of bearing bars and reinforcing ribs are optional depending on individual foundry requirements.





BLACK, SIVALLS & BRYSON, INC.
7500 East 12th Street — Kansas City 26, Missouri

FOUNDRY OUR 60TH YEAR BS&B FLASKS



Copper-base metals being melted at 2400 F in pit type furnaces of the Christensen & Olsen Foundry Co., Chicago, Ill. The ring/cement linings by CARBORUNDUM make for fast, uniform heating — with consistent time per heat.

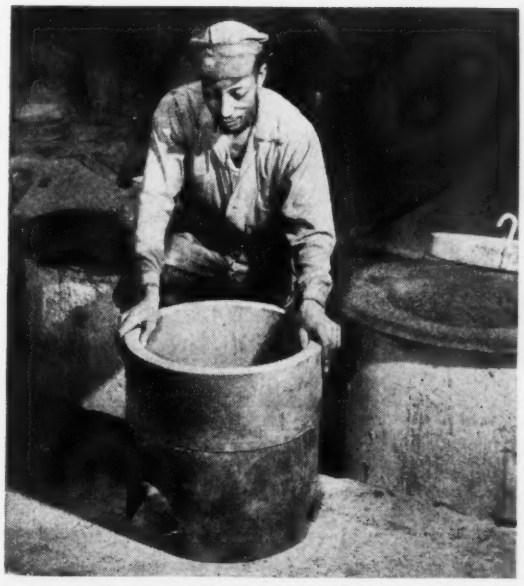
Rudolph Buchhaass examines tilting-furnace lining. The ALFRAX castable cement that backs up the 1¾" thick ring segments is one of the best refractory insulating materials available. It makes a low-heat-capacity furnace and keeps heat loss to a minimum. It's also easy to handle — just mix with water and pour.

"These linings last 2 years"

reports non-ferrous foundry

This Illinois foundry, specializing on copper-base castings, has 10 crucible furnaces — six of the pit type and four tilters. They melt up to 30,000 pounds in a nine-hour day. All have linings made by CARBORUNDUM consisting of complete rings or segmental tile of CARBOFRAX silicon carbide refractory that are backed up with 2½" or more of ALFRAX aluminum oxide castable cement (used for insulation).

"These linings," says the operator, "play a big part in keeping our melting costs so low — as low as any in the area. They are *the* best for this type of work. A complete lining takes only a couple of hours to install, and barring accidents, is good for about *two years*."



New, one-piece CARBOFRAX rings of the type used in the pit-type furnaces. As you can see, the 1½" thick rings are light enough for one man to handle. No hoist is needed to install them. This refractory is highly resistant to flame erosion, spalling, and cracking — it won't soften even at 3000 F or more.

For full information on our rings, ring segments, and cements, address Dept. A-53 Refractories Div., The Carborundum Co., Perth Amboy, N. J. We make lining materials to fit every need, and will gladly furnish specific recommendations. No obligation, of course.

CARBORUNDUM

Trade Mark

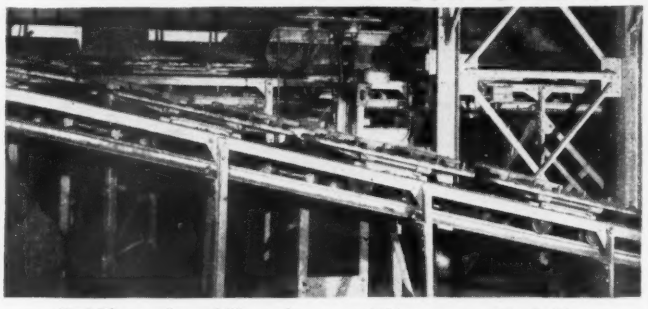
"Carborundum," "Alfrax," and "Carbofrax" are registered trade marks which indicate manufacture by The Carborundum Co.

Large photo—general view of mechanized foundry. Directly above—same shop showing pouring stations.

. . . . . GOES MODERN

Another medium-sized foundry mechanized by Jeffrey. A practical solution to the mechanization of a gray iron foundry making small castings. Sand handling and conditioning, mold conveying, pouring and dumping . . . all worked out to provide "tops in mechanization." Moving smoothly through each operation . . . that's the secret.

Whether your foundry is large or small, we will be glad to help you improve operations—make lay-outs if necessary—to prove that mechanization pays off. Write today.



Uphill or downhill makes no difference with Jeffrey mold conveyors. Note automatic dumper—no men needed here.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

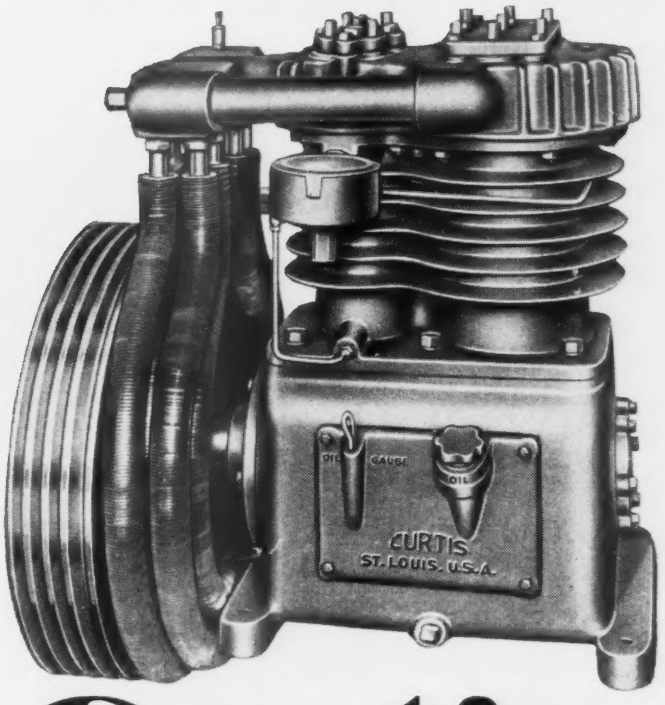
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . . IT'S A JOB FOR JEFFREY!

MORE AIR Per Horse Power

- IT'S TWO-STAGE
- IT'S AIR COOLED
- SELF OILING



The New Curtis

MODEL 98 AIR COMPRESSOR

TWO-STAGE AIR COOLED 15 AND 20 HORSEPOWER

TWO-STAGE — More air per kilowatt hour, assuring savings in power bill.

AIR-COOLED — No expensive water bills; eliminates plumbing installation costs.

INTERCOOLER — Four section, finned, providing unusually effective cooling between stages; cooled by cyclone of air from fan flywheel

SELF OILING — Simple, positive centro ring method; provides pressure lubrication of connecting rod and pistion pin bearings.

TWO TIMKEN MAIN BEARINGS — Tapered rollers; provide easy adjustment made externally without dismantling compressor.

VALVES — Readily removable as assembled units without removing cylinder head or breaking pipe connections or gasket joint.

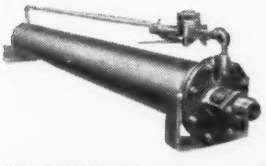
CRANKSHAFT — Counterbalanced, drop forged — two main bearings — no overhung bearing.

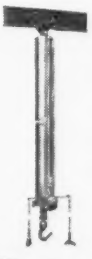
PRECISION WORKMANSHIP — Assures long life and minimum maintenance.

EXPERIENCE — Backed by 99 years of manufacturing — assures you dependable, troublefree service.

Available as a simple compressor or base mounted — motor driven.

LET ONE MAN DO THE WORK
with this Curtis air-operated equipment.





AIR CYLINDERS — for almost any pushing, pulling or hoisting operation.

AIR HOISTS — for low-cost lifting or lowering of materials or machines.

-726

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Co.
1922 Kienlen Avenue, St. Louis 20, Mo.

I am interested in items checked below:

☐ THE NEW MODEL 98 ☐ AIR HOISTS ☐ AIR CYLINDERS
☐ AIR COMPRESSOR

Name.....
Firm.....
Street.....
City.....Zone....State.....

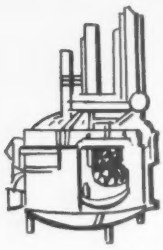
CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company
1922 KIENLEN AVENUE ST. LOUIS 20, MO.

CONTROL

to the unequalled performance of

THESE CHECK POINTS GUARANTEE THE PERFORMANCE OF WHEELABRATOR® STEEL SHOT

MELTING

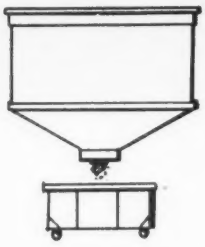


- ✓ **1.** Rigid scrap selection.
- ✓ **2.** Preliminary carbon and manganese analysis.
- ✓ **3.** Complete chemical analysis.

POURING

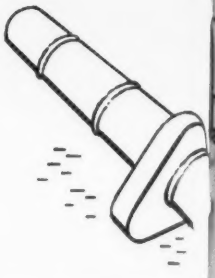
- ✓ **4.** Accurate and continuous control of pouring temperature.
- ✓ **5.** Accurate and continuous control of quench temperature.

FIRST SCREENING



- ✓ **6.** Visual and metallographic inspection in as-cast condition.
- ✓ **7.** Hardness check in as-cast condition.
- ✓ **8.** Continuous inspection of screening operation.

DRYING and SHOT CONDITIONING



- ✓ **9.** Recording temperature control.
- ✓ **10.** Removal of objectionable material.

How many perfect castings do you make in a hundred million pieces? One average shipment of shot, either iron or steel, contains that many individual castings. The greater percentage of imperfect castings it contains, the faster it breaks down and requires replacement. Even slight variations in structure or hardness can have a tremendous effect on cleaning costs.

After years of research, *American* has developed and patented a method for producing shot with an absolute minimum number of defective pellets. It took a new plant and new production methods in order to achieve this quality, and there are 19 CONTROL CHECKS to see that it is maintained.

This new "Wheelabrator" Steel Shot is made of the finest electric furnace steel which is heat treated to a tempered Martensite micro-structure, the hardest and toughest of the iron carbon alloys. It is given a double heat treatment at automatically controlled temperatures to provide a new standard of toughness, solidity, uniformity and efficiency.

FOR YOU this means less abrasive to buy, fewer machine parts to replace, less maintenance labor required and lower freight costs.

Bulletin 89 tells the complete story about "Wheelabrator" Steel Shot and what it means to the user in terms of performance and economy. Write for your copy today.

American

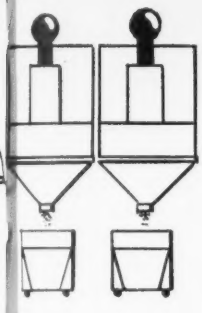
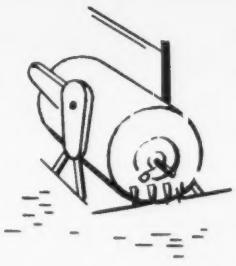
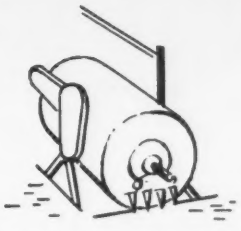
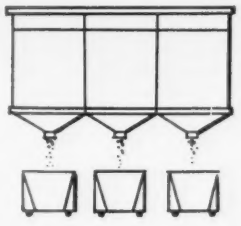
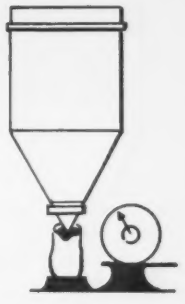
WHEELABRATOR & EQUIPMENT CORP.

505 S. BYRKIT ST. MISHAWAKA, INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

is the key

of WHEELABRATOR® STEEL SHOT

SECOND SCREENING	FIRST HEAT TREATING	SECOND HEAT TREATING	FINAL SCREENING	BAGGING
				
✓ **11.** Continuous inspection of screens.	✓ **12.** Automatic control and permanent record by recording instrument of heat treat time and temperature.	✓ **13.** Automatic control and permanent record by recording instrument of heat treat time and temperature. ✓ **14.** Continuous tests for hardness and carbon content. ✓ **15.** Continuous microscopic inspection.	✓ **16.** Continuous inspection of screens and shot. ✓ **17.** Daily laboratory checks of screening accuracy.	✓ **18.** Continuous inspection of shot. ✓ **19.** Daily shot breakdown tests.

t took a NEW PLANT and NEW PRODUCTION METHODS to produce this NEW SUPER ABRASIVE with the uniformity and structural qualities required for

✓ **MAXIMUM LIFE** ✓ **MINIMUM MAINTENANCE**
✓ **FASTEST CLEANING** ✓ **LOWEST OPERATING COSTS**

To provide this quality product for our customers, *American* has now become the first and only manufacturer of blast equipment to build and operate its own shot producing plant, employing the finest equipment, methods and controls.

The name "Wheelabrator", proudly applied to this new steel shot, is *American's* assurance that you can use this abrasive with confidence in achieving improved performance and economy. Try it soon.

Wheelabrator Steel Shot Laboratory conducts continuous control checks.

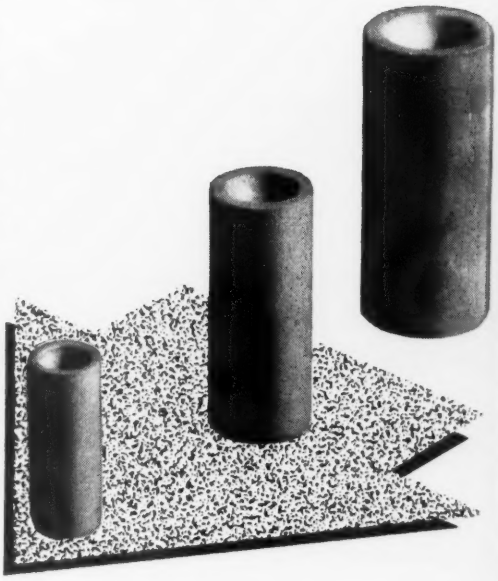
Electric arc furnaces insure accurate control of pouring temperature.

Automatically controlled heat treating equipment assures a non-varying metallurgical structure.

The building was designed for one purpose only — to produce the world's best abrasive.

THREE REAL REASONS WHY

you should use the NORBIDE Pressure Blast Nozzle:

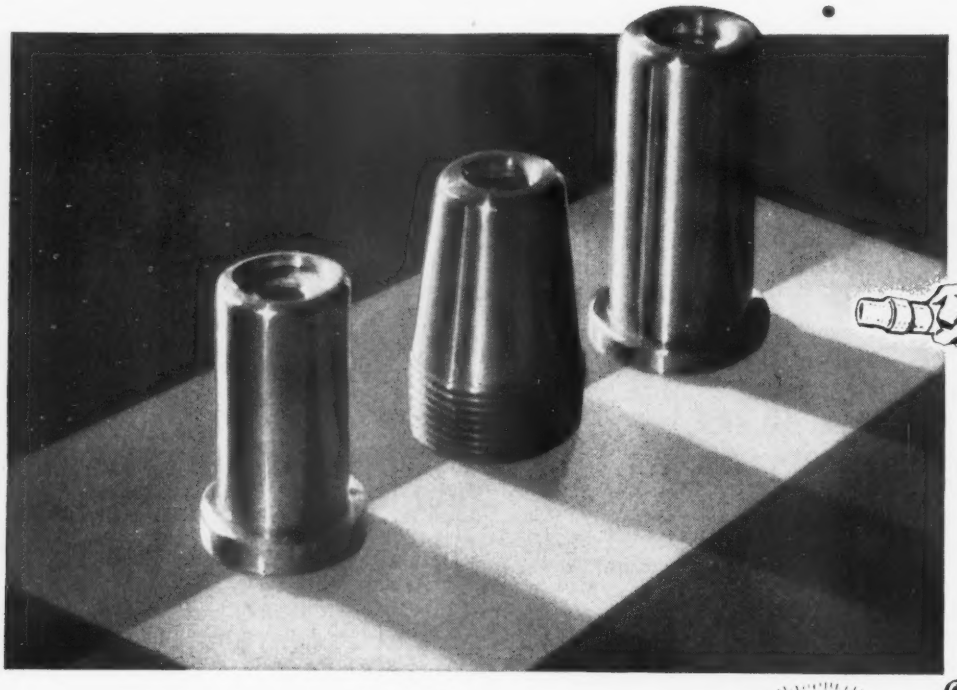


1. More service per dollar cost (750 hours silica sand — 1500 hours steel grit or shot). Norton guarantees this minimum service.

2. Decreases air consumption from 10 to 20 percent as compared with iron nozzles.

3. Maintains stream contour and abrasive velocity.

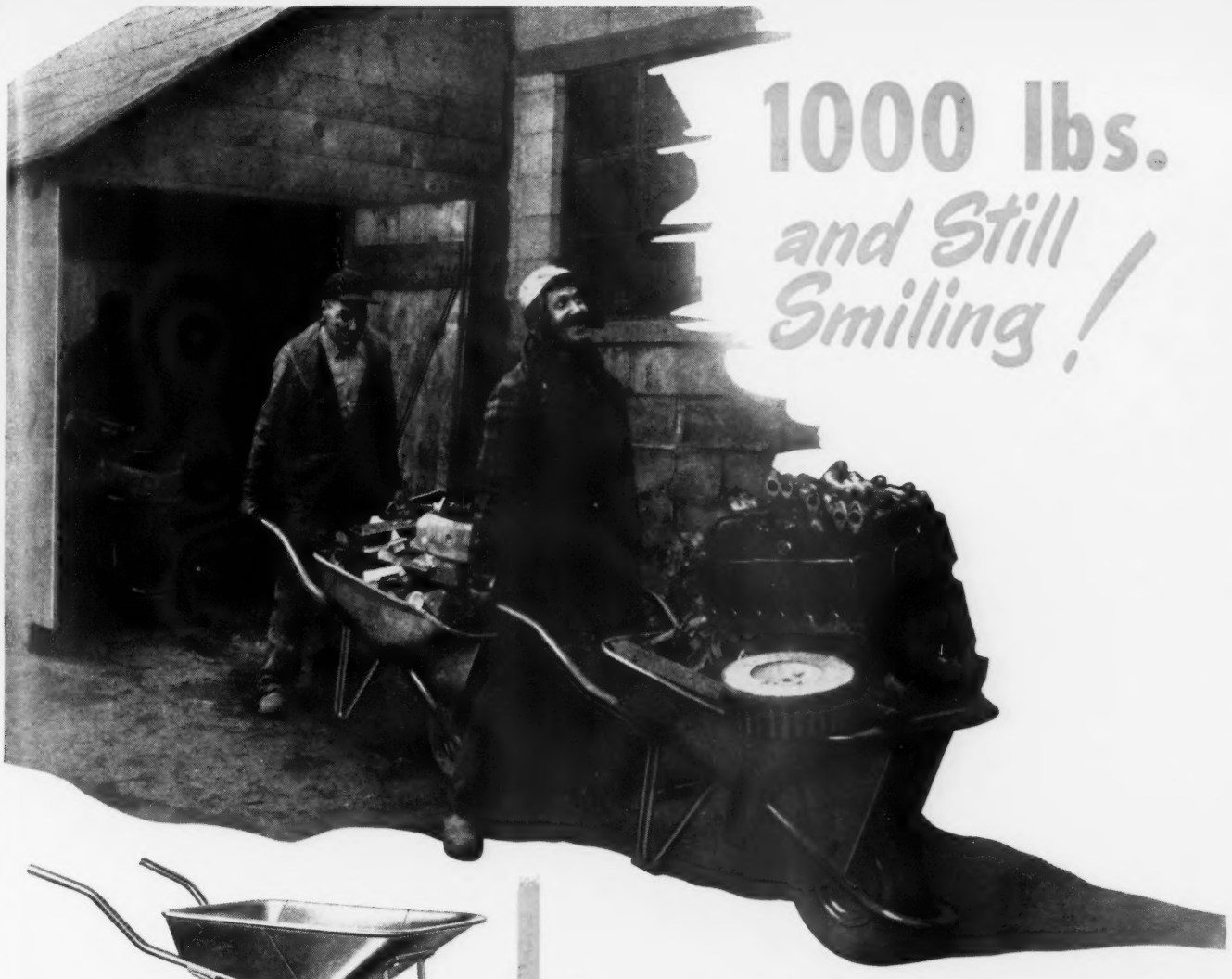
NORTON COMPANY
WORCESTER 6, MASSACHUSETTS



Only the diamond is harder than Norbide

NORTON

Making better products to make other products better



1000 lbs. and Still Smiling!

Model D4-S

The ideal foundry barrow for hauling sand, scrap, castings, etc. 14 ga. welded steel tray. 4 cu. ft. capacity.

Model DF4-S 12 Ga. Extra Heavy Duty

A husky steel plate reinforcement supports the front, back and bottom of tray. Prevents breakage and distortion. Adds years to the life of the barrow. 4 cu. ft. capacity.

Barrow Men Prefer Sterlings Because 80% of Load is Carried by the Wheel

Wheelbarrow Loads in foundries are unusually heavy. Castings, scrap, sand, etc. must be transported, swiftly and economically. But the barrow men don't mind the job if they can carry the loads in easy-wheeling Sterlings.

The scientifically balanced construction of Sterling Wheelbarrows actually takes 80% of the load off the arms and backs of the barrow men. This increases foundry efficiency . . . peps up the men . . . allows more loads to be hauled each day . . . reduces hauling costs.

Sterling's tubular steel frame, reinforced to give additional strength at points where stress and strains are greatest, fortifies the Sterling barrow for the unusually severe treatment in foundries. Sterlings can take hard, everyday punishment and come back for more.

Play safe. Specify Sterling on your next foundry barrow order. Prompt shipment.

Sterling WHEELBARROW CO.

Milwaukee 14, Wisconsin, U.S.A.

BRANCHES: BOSTON • BUFFALO • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • ST. LOUIS

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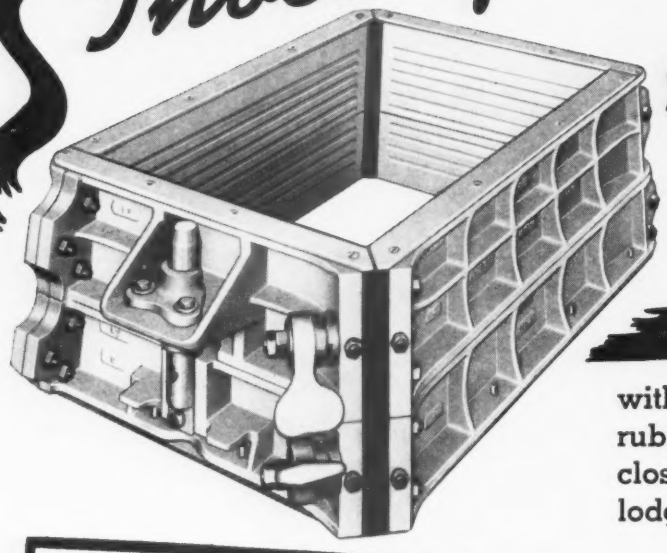
Investigate

the new

FREMONT SPREADLOCK FLASK



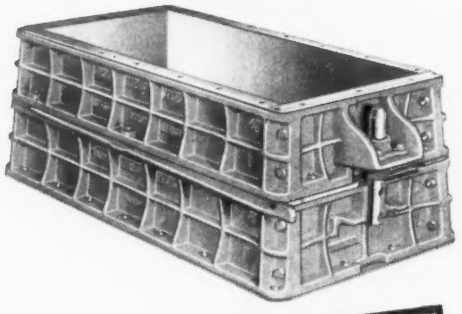
with the long-life, easily replaceable, live-rubber corner inserts which completely close the corner gaps so that no sand can lodge in the open corners.

PERFECT ALIGNMENT Indefinitely!

is guaranteed by the one-inch GROOV-LOCK FOOLPROOF PIN on

FREMONT STANDARD SLIP FLASKS

They are particularly adapted to cope or drag pattern jobs. Other types of standard pin fittings are also available. Solid, bolted and welded corner construction is a feature of Fremont Standard Slip Flasks.



Fremont Magnesium Flasks point the way to more exacting work. Accurately machined inside surfaces and flanges. Steel-faced top and bottom flanges. Magnesium has twice the tensile strength of aluminum, thus assuring longer service, and magnesium weighs 1/3 less than aluminum, making for easier handling.

Write today for free literature and prices.
All orders given prompt attention.

THE FREMONT FLASK COMPANY

FREMONT, OHIO

A spray for molds and cores

TOP-BOND is a surface hardening medium for molds and cores—an air drying spray that penetrates deeply and ties surface sand tightly in place. The air drying operation is a fast one. It leaves the surface firm and hard and protects a clean casting surface at the sand line. A slight torching will speed up drying or, if cores are sprayed while still warm from the oven, they will dry while cooling. The results—beautifully clean castings with a fine surface and perfect contours.

One customer who pours alloy castings that are corrosion, abrasion and heat resisting, has used Top-bond for years. He writes, —

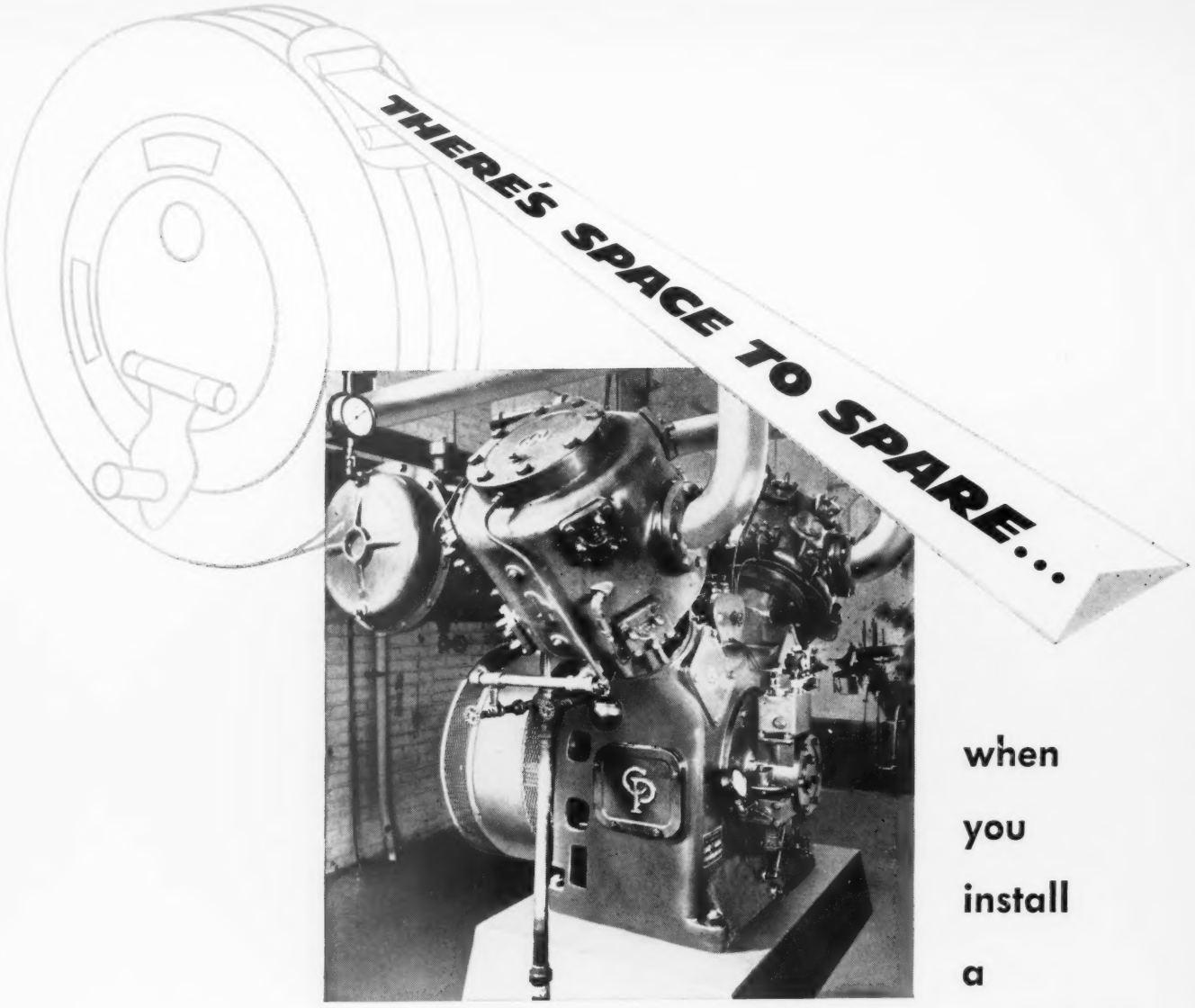
"You will be interested in knowing that we have eliminated all the dipping and washing of cores for our squeezer production by spraying with Top-bond. This has saved us the labor of two core makers, plus an extra drying cycle. Many of our cores are blown and have a relatively soft surface which breaks down considerably in handling from our core room to storage to molds. The use of Top-bond protects this surface and gives an interior finish equal or better than obtained from Silica type washes. "We are also using Top-bond as an air dry spray in our green sand molds. This has permitted us to use green sand where dry sand was formerly considered imperative."

Steel foundries use Top-bond as a spray for green sand cores to build surface hardness up to the hardness of baked cores. When sprayed on their molds, it will keep the surface firm and edges sharp. This kind of an investment in Top-bond starts paying dividends right away.

Write us for a bulletin that describes Top-bond more fully and remember it's Top-bond for top quality and top performance.

UNITED OIL MFG. COMPANY

1429 WALNUT STREET, ERIE, PA.



when you install a **TYPE Y** compressor

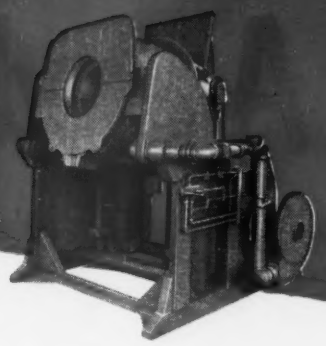
Where space is limited, industry relies more and more on Chicago Pneumatic's compact, heavy-duty Type Y Compressor. It takes up minimum floor area, yet is ideal for long, continuous heavy duty. Shipped as a complete "package" ready for easy installation, it requires the simplest of foundations—needs no alignment.

The highly efficient Type Y Compressor has roller main bearings, precision connecting rod bearings, multi-step capacity regulation, and an easy-to-clean shell-and-tube intercooler.

Available in sizes from 75 hp to 250 hp, 410 cfm. to 1663 cfm., and with flange mounted, belted and coupled motors. Write for Bulletin 766. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

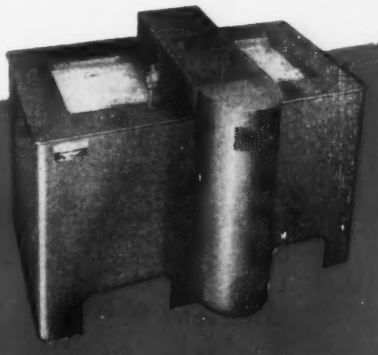
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



a complete line of

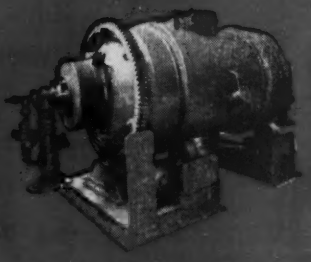
MELTING AND HOLDING FURNACES

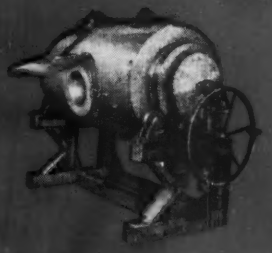
by Lindberg-Fisher



for melting

- aluminum
- magnesium
- copper
- copper-nickel alloys
- bronze
- brass
- yellow brass
- red brass
- tin
- zinc
- lead
- babbitt
- type metal
- gold precipitates
- silver precipitates





Because Lindberg-Fisher builds *all* kinds of melting equipment . . gas . . oil . . electric . . induction, and carbon arc . . L-F engineers are able to recommend, without prejudice, the proper type of furnace for *your* particular melting requirements.

Melting specialists for 25 years
Sales and service offices in principal cities

Bulletin 201 covers the complete melting line. Write for your copy today.

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A product for EVERY

• Your Widest Choice of Abrasives for Every Operation

PRODUCTS	SNAGGING or ROUGH GRINDING	DEBURRING	WELD GRINDING	SMOOTHING EDGES	FINISHING and POLISHING	DIE GRINDING
Straight Wheels	✓		✓		✓	✓
Rubber Bushed Straight Wheels	✓		✓			
Mounted Wheels		✓	✓	✓		✓
Cup Wheels	✓		✓			
"MX" Straight Wheels	✓	✓	✓		✓	✓
"MX" Mounted Wheels		✓		✓	✓	✓
"MX" Discs and Depressed Center Wheels	✓	✓	✓	✓	✓	
Coated Abrasive Discs		✓	✓	✓	✓	✓
Coated Abrasive Bands and Sleeves		✓		✓	✓	✓
Cartridge Rolls		✓		✓		✓
Coated Abrasive Belts with "Port-A-Belt" Grinding Attachment	✓		✓		✓	✓

...from CARBO

TRADE

"Carborundum," "MX" and "Port-A-Belt" are trademarks of The Carborundum Company, Niagara Falls, N. Y.

PORTABLE GRINDING job

Deburring with slotted discs. You can choose the deburring method best for you from at least 7 abrasive products by CARBORUNDUM.

Weld clean-up with rubber-bushed straight wheel by CARBORUNDUM...one of 8 ways you can grind welds with portable equipment.

Rough grinding with straight wheel. This job could also be done economically with abrasive belts and the Port-A-Belt grinding attachment by CARBORUNDUM.

How can you be *sure* you're getting the highest possible production at the lowest possible cost in your portable grinding operations? By asking CARBORUNDUM—your *one source* for every type of abrasive product.

CALL YOUR CARBORUNDUM DISTRIBUTOR TODAY. He offers experienced counsel, complete stocks, prompt delivery.

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FOR INCREASED PRODUCTION and LOWER UNIT COST...

Call on Knight Engineering Experience

Knight Engineers have had from 10 to 30 years of successful Foundry experience in solving all types of management, production, and equipment problems, including the design and construction management of complete new plants and equipment.

As an organization they have completed more than 200 assignments covering all fields of engineering for the foundry industry: survey of facilities, foundry layout, foundry design, construction supervision, modernization, mechanization, materials handling, production control, cost control, industrial engineering, wage incentives, organization, and management.

Combine the broad experience of Knight Engineers with your organization's knowledge of its specific problems, and you will secure the most efficient operation and the best solution to the problem.

Call or write our Chicago or New York office for prompt attention.

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Barrett's

R-146

A new powdered resin developed especially for

shell molding

designed for high speed production

Rapid investment • Excellent fidelity to pattern • Clean finish
Uniform cure • Increased strength • No peel or fall-back

Clip this convenient coupon to your letterhead for test samples of R-146 or the services of Barrett Field Engineers.

☐ *Please send me a sample of Barrett's new resin—R-146—designed for high speed production of shell molds.*

☐ *Please have one of Barrett's Field Service Engineers call to discuss applications of shell molding in our operation.*

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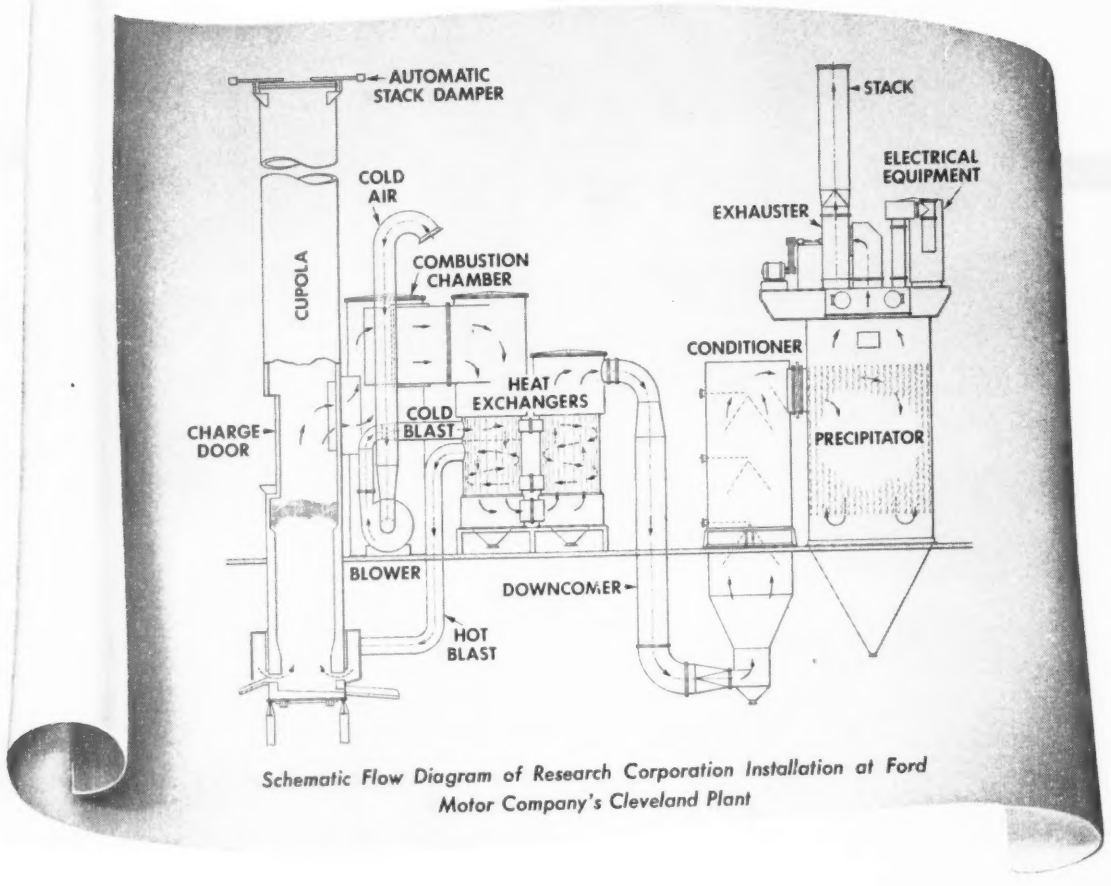
NEW CUPOLA PRECIPITATORS

assure clean stacks at Ford



Schematic Flow Diagram of Research Corporation Installation at Ford Motor Company's Cleveland Plant

The schematic diagram above shows how one of the five Cottrell Precipitators removes suspended dust from the gases originating in ten iron ore cupolas. These Research Corporation units consist of (A) a water spray conditioning and cooling chamber, (B) a vertical flow precipitator with the patented MI Rapper, which eliminates rapping puffs, and (C) an induced draft fan.

If your cupola stack gases are a problem, contact your Research Corporation Engineer. He will give you the benefit of development and pilot plant experience as well as recommendations based on results of commercial installations.

RESEARCH CORPORATION

405 Lexington Avenue, New York 17, N. Y.
Bound Brook, N. J. • Grant Building, Pittsburgh 19, Pa.
122 South Michigan Avenue, Chicago 3, Illinois

RC 142

Call for Republic's Pig Iron Metallurgist

We don't guarantee his versatility with a coffee pot, but when it comes to a foundry pouring problem, you can expect prompt, effective help from the Republic Pig Iron Metallurgist.

His knowledge of foundry operations is based upon a combination of metallurgical training and actual foundry experience . . . years of it. He knows how and why irons behave as they do at different temperatures . . . knows what to do, within equipment limitations, when problems upset the profit picture.

You can trust this man to respect your confidence, too, just as he has for hundreds of other foundries—large and small. His only obligation is to you . . . to help solve your problems in the fastest, most efficient way possible.

There is no charge for the services of the Republic Pig Iron Metallurgist. Just write, wire or phone and you'll hear from him promptly.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

Tabor's Cope and Drag T

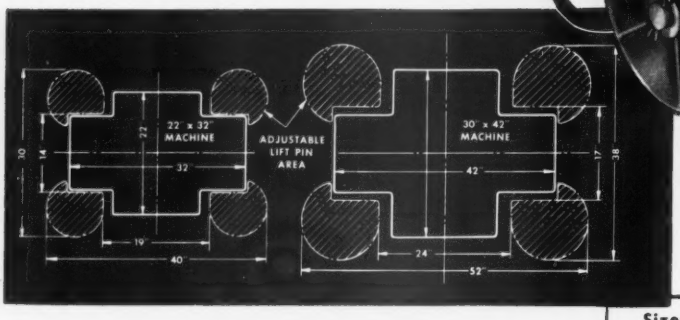
Matched M for Speed a

Each of these machines is a star performer in its own right. Working together, they're unbeatable for keeping cope and drag production in near-perfect balance.

ROLLOVER FEATURES — completely power operated; shockless machines completely portable up to 1000 lb. capacity; new jarring end designed for peak effectiveness; plain jar or shockless jar (*absolutely shock-free*); plate-locking device to stop all plate wobble or "secondary jolt"; quick change-over plate to protect against varying work; double air-operated clamps for top speed operation; internal jarring valve; complete cycle of operations in the *fractional part of a minute.*

JAR FLASK LIFT FEATURES — available in stationary or portable models; plain or shockless jar; adjustable flask lift pins to cover a wide range of flask lengths and widths (see diagram); Tabor's famous air-on-oil draw; working access from three sides.

PUT THEM TOGETHER IN YOUR FOUNDRY —and you have a team with ability and flexibility. They'll roll where you want them—meet critical schedules in the production shop—put high-production features into short-run work in the jobbing shop. And—traditional with Tabor—give long life at low up-keep.



Size of Machine	22" x 32"	30" x 42"
Capacity—80# Air	600#	1000#
Patt. Draw.—Plain Jar; Oil Controlled	10"	12"
Patt. Draw.—Shockless; Oil Controlled	9"	12"
Height Table from Floor—Portable	28"	32"
Height Table from Floor—Stationary	26"	30½"
Weight Shockless Jar	2600#	4000#
Weight Plain Jar	1900#	2700#

REPRESENTATIVES

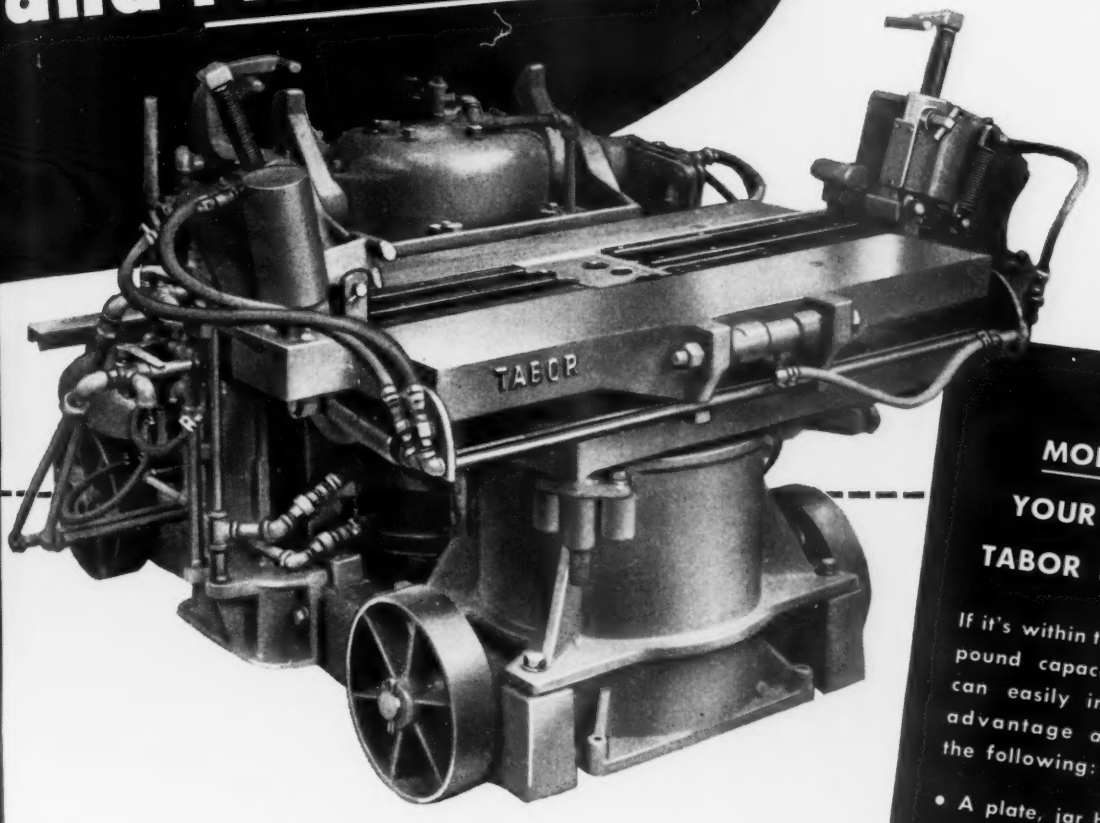
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

save labor

Size of Machines	Sizes of Rollover Plates		Length of Pattern Board when using Flask Clamps		Height Plate from Floor		Max. Space for over-all depth of Flask, Pattern Board and Bottom Boards	Draw	Capacity (lbs.)
	Width	Length	Min.	Max.	Plain Jar	Shockless Jar			
22″	22″	42″	16″	43″	25″	29″	17½″	10″	600 lbs.
30″	30″	40″	20″	53″	27¾″	32¼″	20½″	12″	1000 lbs.

Team . . .

Machines and Flexibility



MODERNIZE YOUR PRESENT TABOR ROLLOVER

If it's within the 600 to 3,000 pound capacity range, you can easily install to great advantage any or all of the following:

- A plate, jar head, and jar piston made of steel
- Plate-locking device
- Quick change-over plate and double clamps
- Air-operated mold receiver

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

Export Department, 765 Drexel Bldg., Phila. 6, Pa.

. . . buy Tabor

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

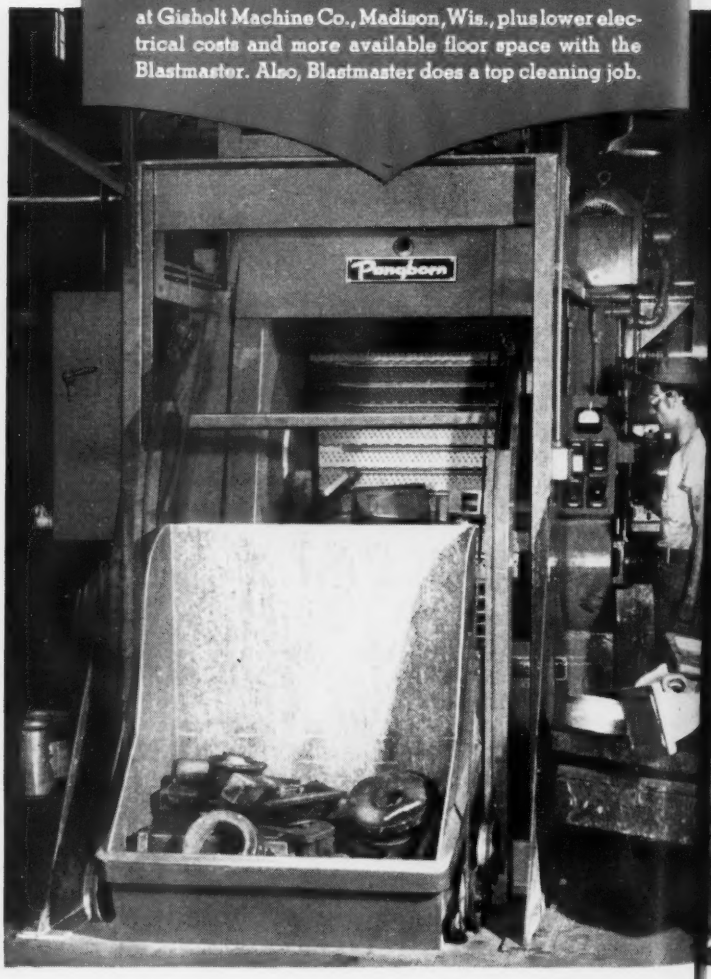
Higher output, lower
Pangborn Blastmaster

Doubled cleaning output per man-hour

at Riverside Foundry Co., Wrightsville, Pa. Riverside officials praise the high quality of cleaning . . . the wide range of casting sizes the Blastmaster can handle.

33⅓% cut in labor costs

at Gisholt Machine Co., Madison, Wis., plus lower electrical costs and more available floor space with the Blastmaster. Also, Blastmaster does a top cleaning job.



72 BLASTMASTER BARRELS SOLD IN 8 MONTHS

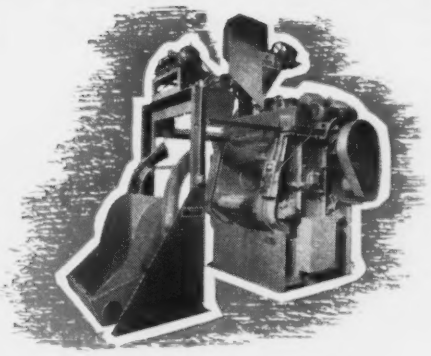
OVE
SERV

costs, job versatility...
er gives you all three!

Great variety of cleaning jobs

at Emsco Derrick & Equipment Co., Los Angeles, Cal. Blastmaster cleans intricate castings, forgings and stampings *faster* and *better*.

These firms proved these claims for the Pangborn Blastmaster Barrel



USERS of the Pangborn Blastmaster ROTOBLAST® Barrel know that Blastmaster's exclusive features pay off in better, faster, cheaper cleaning! They praise features like the abrasive-tight door that prevents waste . . . the automatic throw-out torque arm that protects machine and operator . . . the work conveyor that will not clog or pinch . . . the easy-to-adjust conveyor take-up. And Blastmaster incorporates the famous Pangborn ROTOBLAST that does a *better* job and saves you money by saving you time, labor, space, power and tools!

Whatever aspect of blast cleaning interests you—quality, speed, economy, or all three—find out more about the Pangborn Blastmaster Barrel. Available in 4 sizes—3, 6, 12, or 18 cu. ft. capacities. For more details, write for Bulletin No. 223 to: PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Md.

OVER 28,000 PANGBORN MACHINES SERVING INDUSTRY

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

5 ways you save costs with Plaskon resin core binders

Plaskon Resin Core Binders can bring you savings in time and money on the casting of all metals.

Here are 5 important qualities that speed production and lower costs:

1 Increased Oven Capacity—Lower Fuel Costs:
Just enough heat to thoroughly dry out the cores is sufficient to set the resin, so that no extra baking is necessary.

2 Less Rejects—Closer Tolerances:
During casting, no tars are formed to clog vents and reduce the permeability of the sand. This reduces blows, gas holes and porosity to a minimum and permits the use of finer grain sand, yielding better detail and casting finish.

3 Lower Shakeout Costs:
After casting, the binder is sufficiently burned out, so that the sand readily shakes out of the most intricate passageways. Cracks and hot tears are usually eliminated.

4 Greater Tensile Strength Means Less Core Scrap:
Cores may be made extremely hard and strong, reducing the need for wires, without losing excellent knockout and collapsibility properties.

5 Excellent Stability:
Plaskon resin core binders are supplied in both stable powder and liquid forms, giving the individual foundryman his preference.

To find out how Plaskon foundry resins can save you money, send today for complete technical information. Contact Frederic B. STEVENS, Inc., distributors, or write direct to Plaskon Division, Libbey·Owens·Ford Glass Company, Toledo 6, Ohio.

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DETROIT 16, MICHIGAN

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INSIST ON
PLASKON®
FOUNDRY RESINS
FOR BETTER SAND CORE BINDERS

LOF GLASS PLASKON FIBER-GLASS

"EDCO Dowmetal BOTTOM BOARDS have resulted in tremendous savings for our foundry"

...says M. C. Crawford of RILEY STOKER CORPORATION

RILEY STOKER CORPORATION
FUEL BURNING AND STEAM GENERATING EQUIPMENT
101 WALKER STREET, DETROIT 7, MICH.

Christiansen Corporation
1515 North Kilpatrick Ave.
Chicago 51, Illinois

May 16, 1951

Attn: Mr. Edw. S. Christiansen, Pres.

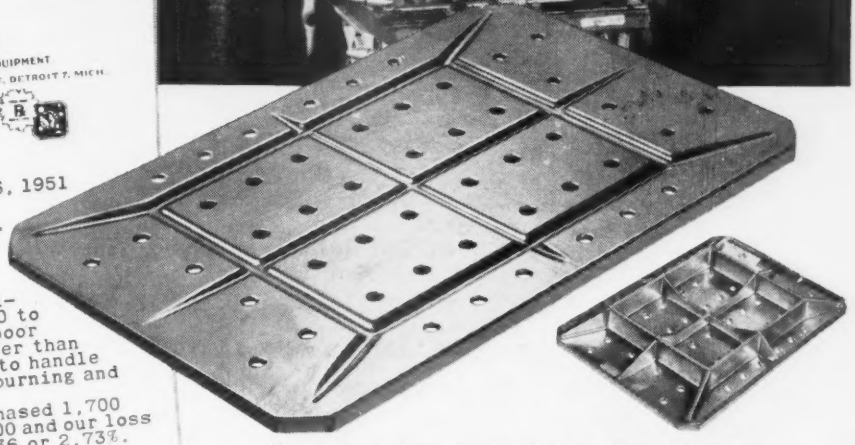
Gentlemen:

Before the purchase of EDCO Dowmetal Bottom Boards, we made our own wood boards at a cost of approximately 70c each. We would make 5,000 to 6,000 per year and ended up with a poor quality board. They were much heavier than EDCO magnesium boards, not as easy to handle on the line, and our losses due to burning and breakage were 60 to 80% per year.

In three years time, we have purchased 1,700 of your boards at a cost of $7,585.00 and our loss in this period has been only $207.36 or 2.73%.

EDCO Dowmetal Bottom Boards have resulted in tremendous savings for our foundry. It is a pleasure to recommend them to other foundries.

Yours very truly,
RILEY STOKER CORPORATION
M. C. Crawford
M. C. Crawford
Director of Purchases
Detroit Plant



Above photo shows molder at Riley Stoker Corporation placing EDCO Bottom Board on flask preparatory to pressing. EDCO DOWMETAL magnesium boards maintain high quality of castings and reduce rejects because the exclusive grooved and vented design permits escape of gasses and insures mold stability.

Progressive foundry operators, like Riley Stoker Corporation, are equipping their foundries with EDCO DOWMETAL Bottom Boards.

Made of magnesium, these boards will not warp or break. There are no nails to come out, nothing to break or split—no upkeep! So durable, they can be considered permanent equipment. The many advantages from the use of these boards are effective immediately on their installation.

Write us or phone CApitol 7-2060 today for complete price schedule and list of 74 standard sizes available from stock.

Riley Stoker Corporation is one of the three largest manufacturers of steam generating and fuel burning equipment in the country. EDCO DOWMETAL Bottom Boards are used exclusively in their foundry in the production of gray iron and alloyed casting components.

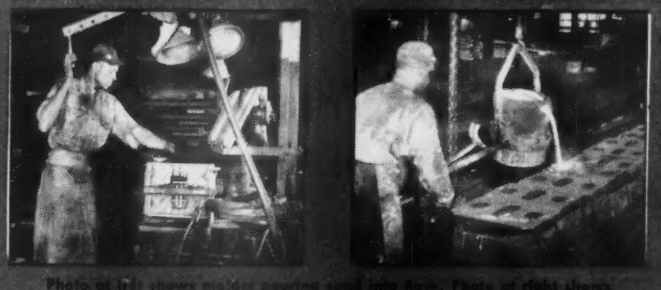


Photo at left shows molder pouring sand into flask. Photo at right shows molten metal being poured into molds which rest on EDCO Bottom Boards. Gravity conveyor line carries molds on for further processing.

EDCO CHRISTIANSEN CORPORATION

CHRISTIANSEN CORPORATION
1517 N. KILPATRICK AVE. • CHICAGO 51, ILLINOIS
ALUMINUM ALLOY INGOTS • ZINC BASE DIE CASTING ALLOYS

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THAT'S what one of the many enthusiastic Clearfield Mixer owners told us . . . "perfect in every respect." We're very happy that the performance of our equipment brings forth such remarks.

Clearfield Mixers, with their unique revolving pan principle and their fully automatic controls, take all the guesswork out of sand preparation. And they're available in a large range of sizes for use independently or as an integral part of a sand conditioning system. You can't go wrong with a Clearfield.

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See us at the FOUNDRY CONVENTION
BOOTH No. 1740
Atlantic City
May 1st to 7th

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CLEARFIELD MACHINE COMPANY
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- **MEXADIP WILL NOT FERMENT.** You will not have to dump your wash because of hot humid conditions — no pock marks or pitted coating surfaces with MEXADIP.

- **MEXADIP STAYS IN SUSPENSION.** Let it stand over the week end, it will be ready to go Monday morning.

- **MEXADIP WILL NOT RUN, BUILD UP OR RUB OFF.** It applies equally well on either green or baked cores.

- **MEXADIP IS DEPENDABLE AT ANY BAUME.** It is applied daily to cores for thousands of tons of castings over a range of 10-40 degrees Baume.

- **MEXADIP REQUIRES NO LONG "PASTE" MIXING.** No waiting period is necessary. Just add the powder to water and after a few minutes of stirring it is ready to go.

IMPROVE CASTING APPEARANCE AND SAVE MAN HOURS IN THE CLEANING ROOM. If you have a problem with core wash, MEXADIP will solve it. Ask us to arrange a test today.

Why wait . . .
Start now — Use MEXADIP™

168

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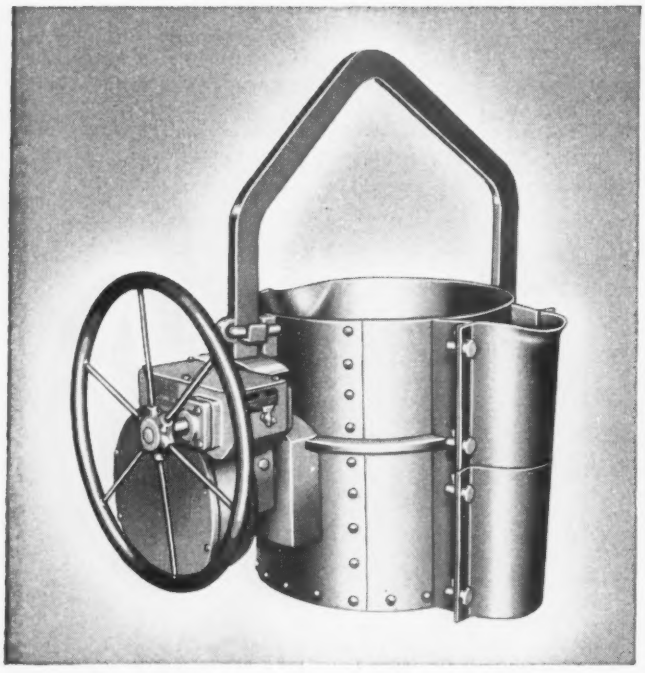
DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

YOU'LL FIND THE TYPE LADLE YOU WANT AT

Ladle Headquarters



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From the vast natural clay deposits located in Southern Ohio we have gone "all out" in the matter of refining a very superior bonding clay—AIRFLOATED. This product is artificially dried and ground exceptionally fine. It has a remarkably wide range of uses and applications. It is available every day in the year and is used by foundrymen everywhere.

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Located in the heart of the Southern Ohio Clay District, we make use of the best and most up-to-date equipment for mining and processing natural clays. Our PULVERIZED BONDING CLAY fills the need for a plastic bonding agent that has a high refractory value, has high dry strength at high temperatures, has greater durability, makes a smooth working sand and is more economical.

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Ordinary fire clay, in its original condition as dug from the earth, will sometimes serve to line cupolas, ladles, plug tap-holes and lay up fire brick. The impurities, however, will more than likely undo any good that it does. CEDAR HEIGHTS FIRE CLAY is carefully mined and processed to do a good job in the foundry. It is uniform in quality, smooth, clean and effective. That is the characteristic of our Fire Clay—and has been for the past 28 years.

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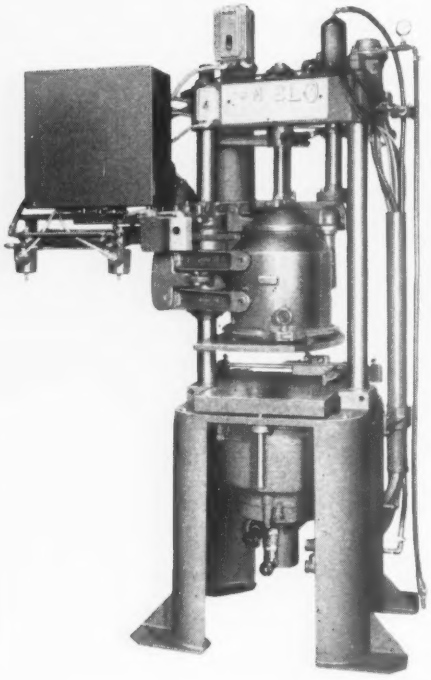
there's a SAN

All "40" model SAN-BLO's will blow cores weighing from ½ lb. to 40 lbs. each—using any core sand mixture capable of hand-ramming—with moisture content to 8%, green strength to 12 p.s.i.—using one standard sand magazine for all jobs.

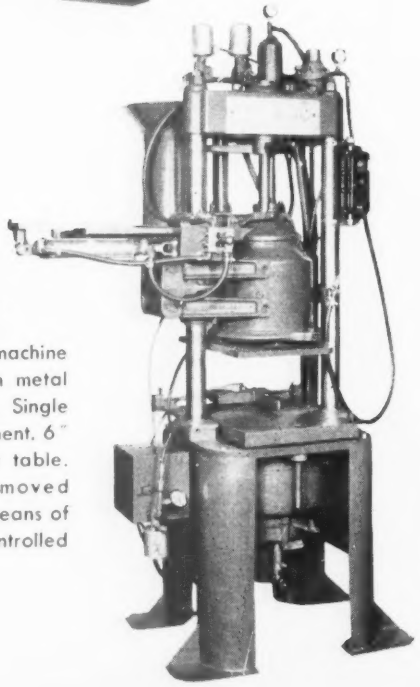


MODEL 40-D-9

For fastest production of cores in metal core boxes. All operations automatically controlled and timed—blow cycle, core drawing, sand magazine refilling. A single starting button controls entire operation.

MODEL 40-DD

This machine performs the same functions as the full-automatic model, but all operations are manually controlled. 6" stroke, clamp-draw table. Sand hopper refilled from floor.



PULSATOR MODEL 40-P-2

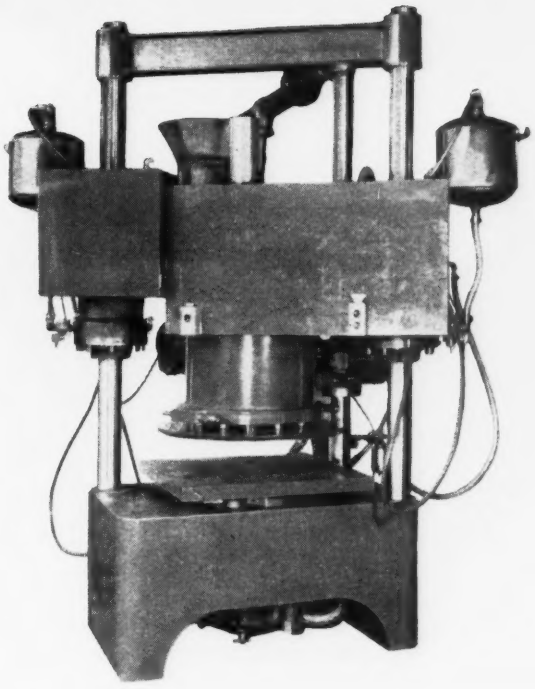
The all-purpose machine that blows cores in metal *and* wood boxes. Single control, fast adjustment. 6" stroke, clamp-draw table. Sand magazine moved under hopper by means of an air cylinder, controlled by hand valve.

MODEL 40-D-1

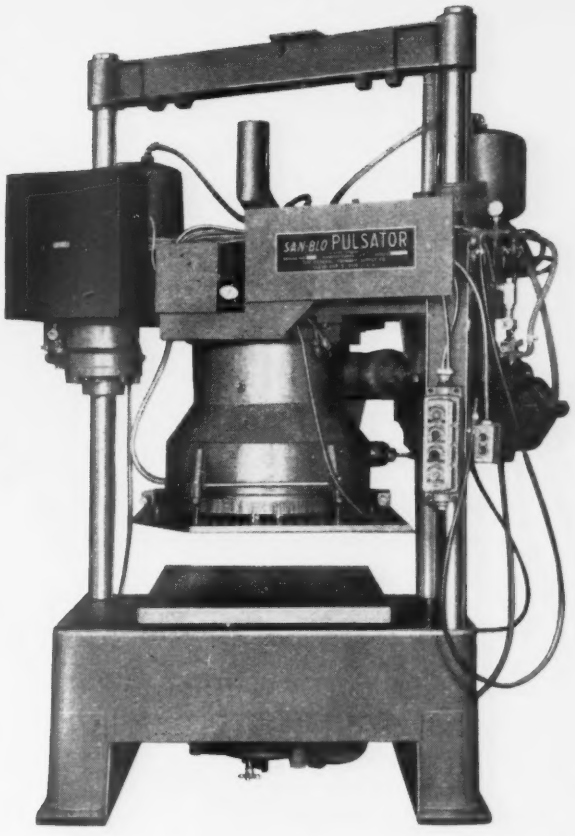
This model, also for metal boxes, is similar to the 40-DD described above, plus automatic control of the blow cycle. A push button starts the blow cycle and an electric timer controls its length.

There are 29 other SAN-BLO models available, offering a wide variety of controls and features, to suit your specific requirements.

BLO to meet your requirements . . .



PULSATOR MODEL P-150
FOR CORES TO 150 LBS.



PULSATOR MODEL P-250
FOR CORES TO 250 LBS.

These two models, for blowing cores weighing from 5 lbs. to 150 lbs. and 5 lbs. to 250 lbs., have all the features of the 40 model PULSATOR, plus additional controls and features necessary for blowing large cores in metal *and* wood core boxes. Entire operation is completely automatic and controlled by a single push button. Sand magazine refilled automatically and adjusted to box height hydraulically. Roller conveyor may be used at rear or side of machine, to facilitate moving core boxes in and out.

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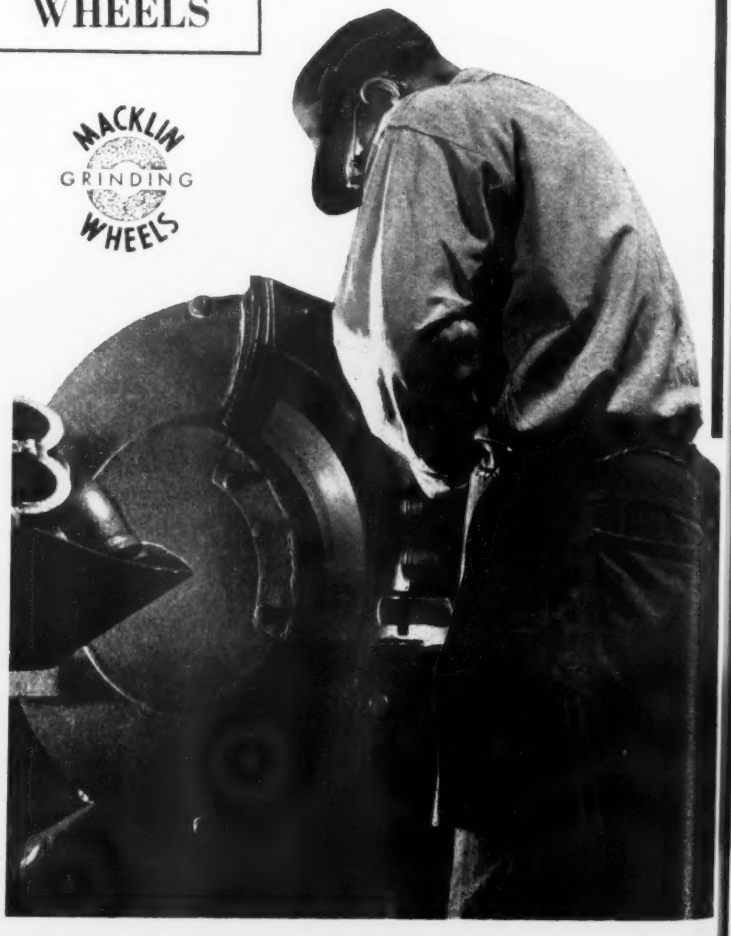
Specify Macklin wheels for your Foundry grinding jobs. Tried and proved they will . . .
"PROTECT YOUR PRODUCTION" and give you cost saving results. Years of experience combined with competent engineering and research facilities have provided the best grinding wheel for all types of Foundry grinding requirements. DEPEND on Macklin for the right wheel for every job



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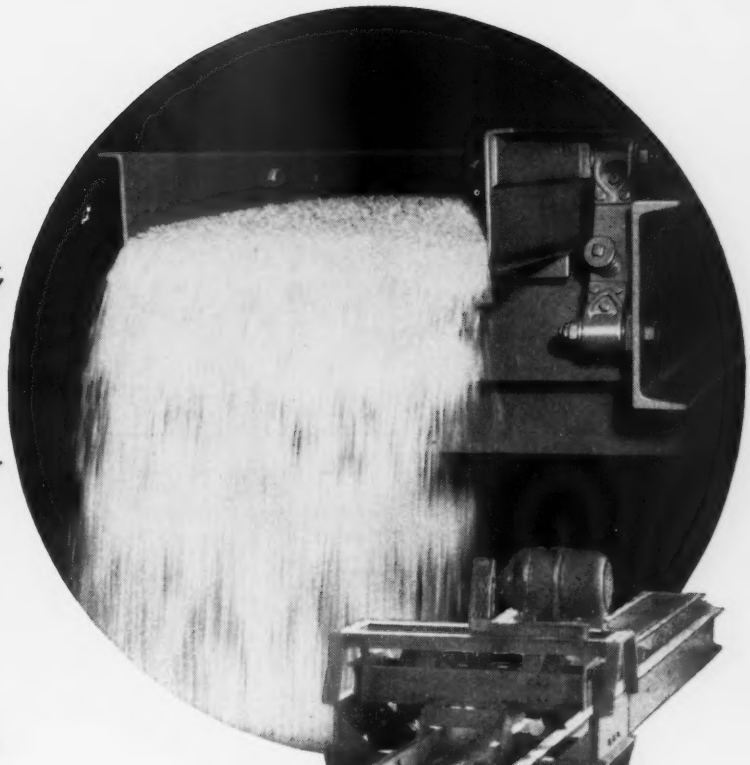

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make sand run like water

Cut down rising costs by cutting costs of moving, scalping and separation of sand, sprues, core wires and other foundry materials. No shoveling, no non-productive labor costs. Easily installed on or below floor. Low first cost, low installation cost, low power cost and low maintenance cost. Used by foremost custom and production foundries.

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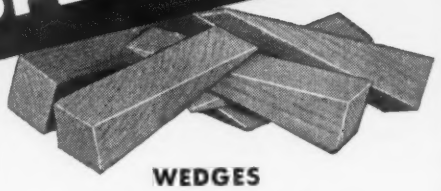
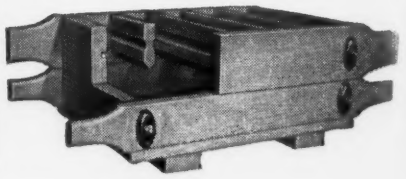


WEDGES
Hard or soft wood



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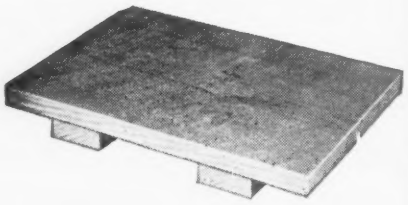
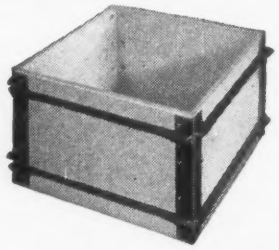
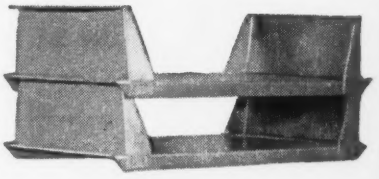


CMD WOOD BOTTOM BOARDS
All sizes and shapes



CMD NON-WARP, NON-BURN SLIP JACKETS



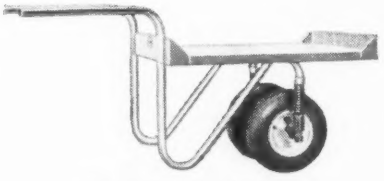
CMD DUAL-PURPOSE CORE TRAYS

CMD TYPE F CHIPPING HAMMER
Metal handle. Head has 2 chisels at right angles

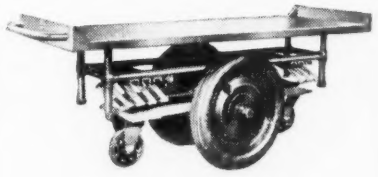
CMD TYPE A CHIPPING HAMMER
Combination drift and chisel

CMD TYPE C CHIPPING HAMMER
For general hand chipping

TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.



CMD PNEUMATIC CORE BARROWS
With single wheel or two wheels. (as shown here)



CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

WRITE FOR BULLETINS
On CMD core-conveying equipment and other foundry specialties—preferred by experienced foundrymen for 25 years.

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29-year-old Lectromelt Furnace still hard at work for Dibert, Bancroft and Ross Co., Ltd. of New Orleans, manufacturers of sugar mill machinery, dredge boat machinery and electric steel castings

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"After 29 years of trouble-free service this Lectromelt* C-18 Furnace looks only a year old. It performs as well as when installed, turning out 8-ton heats in three hours."

Today's Lectromelt Furnaces are masterpieces of engineering compared to this C-18. And you get even greater durability and dependability.

New Lectromelts, of course, are top-charged to save manpower, speed production, cut electrode consumption and give you added lining life. Power supply and power regulation equipment is specially engineered to fit your installation.

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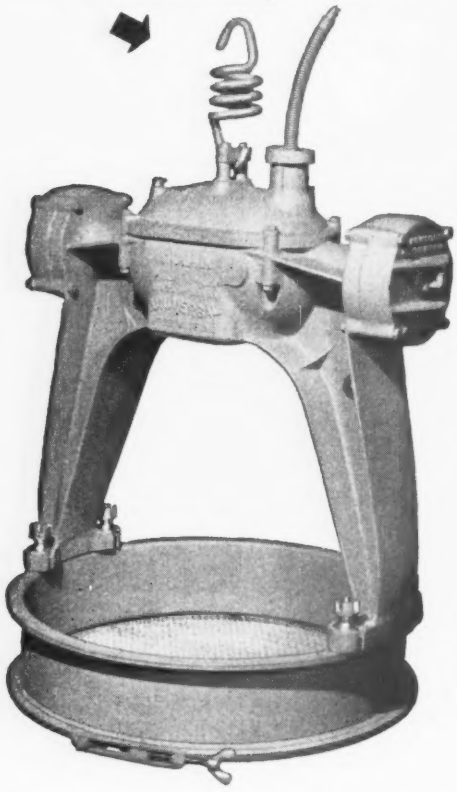
"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

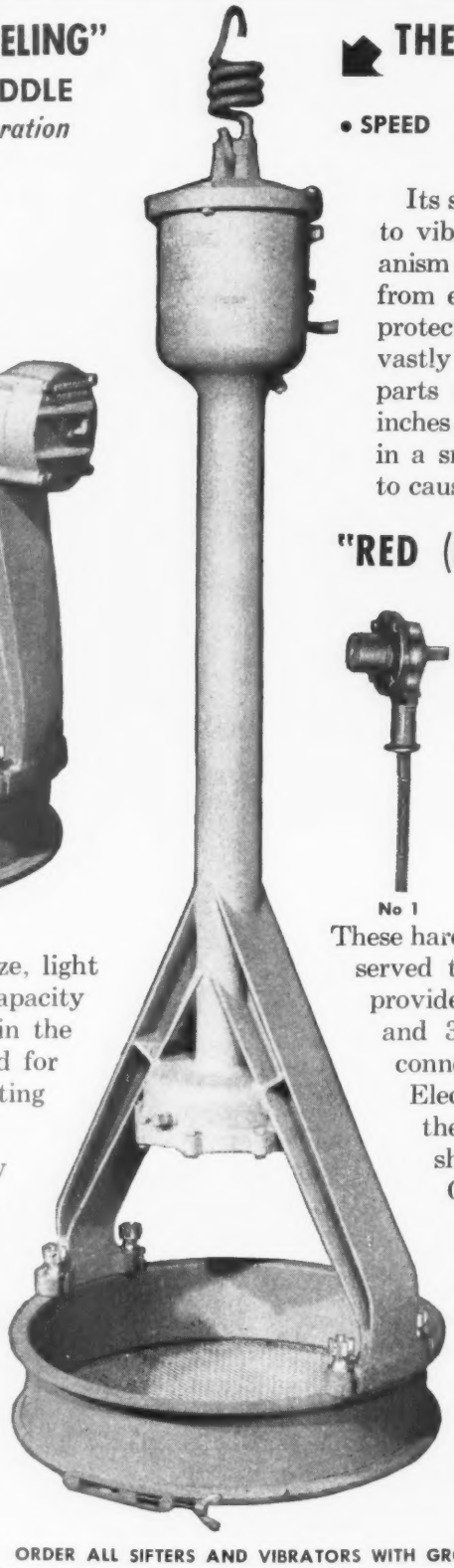


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



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- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area — are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

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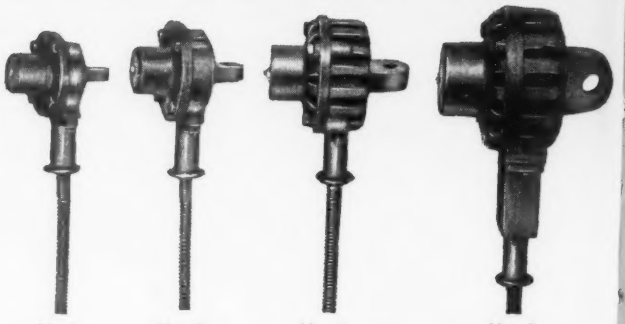

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- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
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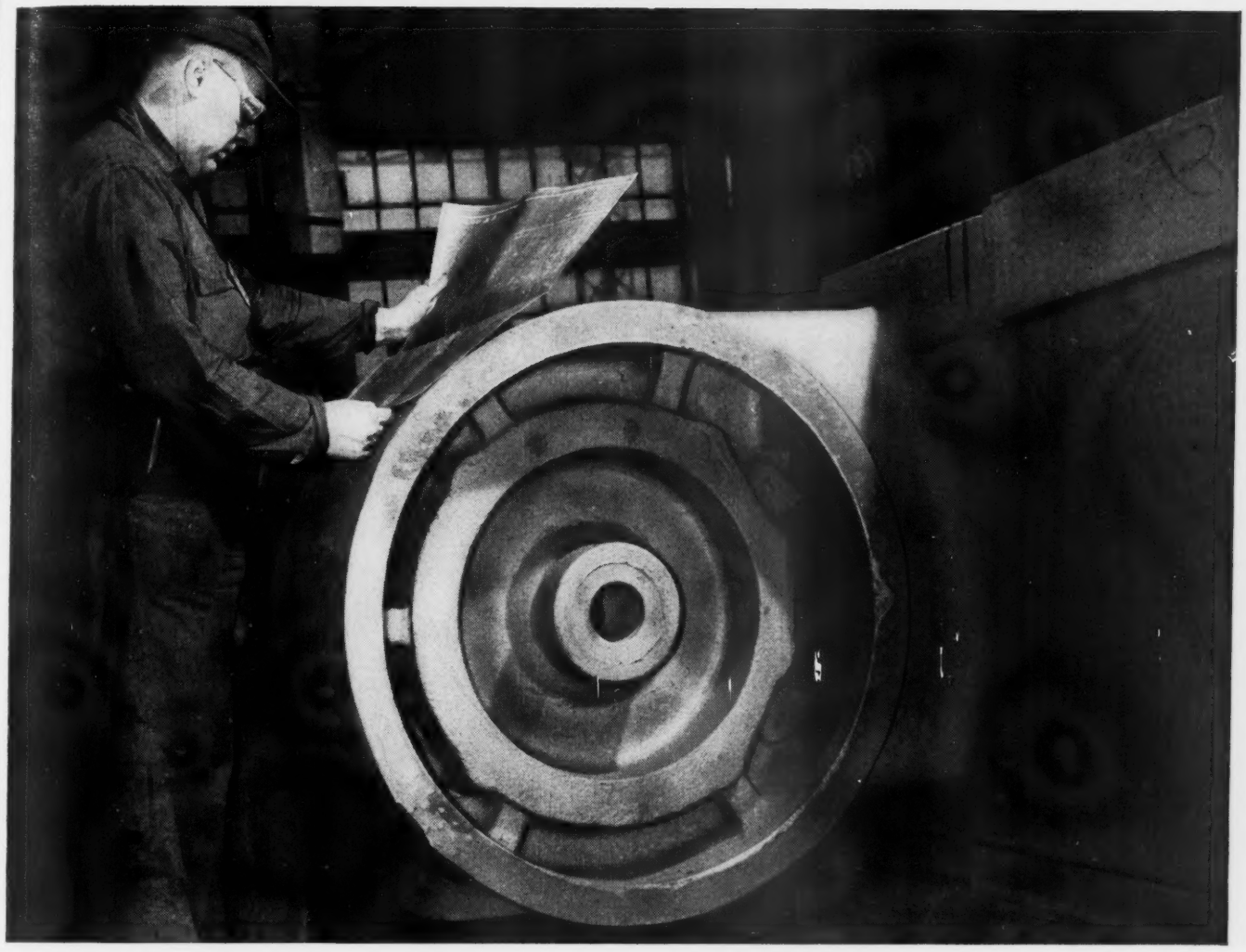

BETTER CORES, BETTER CASTINGS, FOR BULLARD

with Truline® Binder in the Mix

Section of an iron casting for a Bullard Vertical Turret Lathe, pictured above, shows the clean smooth results that Truline helps to produce.

The Bullard Company, Bridgeport, Conn., reports a considerable saving in binder costs since their switch to Truline. Because Truline-bonded cores shake out quickly and easily, cleaning and chipping are reduced appreciably.

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Seldom does new equipment installed in a plant pay for itself as quickly as Cleveland Tramrail in foundries. Whether in a gray iron, steel, or non-ferrous foundry, the advantages of Cleveland Tramrail are so great that the original capital expenditure is usually returned by the equipment in one year.

Pouring hot metal is one of the many important foundry jobs which overhead Tramrail makes faster, easier, safer. In addition, heat loss is drastically reduced because the metal can be conveyed directly from cupola to mould via Tramrail in considerably less time. Large unit amounts of metal can be handled per trip and need of transferring to smaller pouring ladles is obviated.

The same overhead Tramrail trackage, bridges, carriers, and hoists can also be used for all other foundry handling. Sand, delicate moulds, patterns, and castings can be transported quickly by Tramrail without interference with floor obstacles and traffic.

Let us show you what other foundries—hundreds of them—have accomplished with Cleveland Tramrail. Then you can settle in your mind whether this offers real possibilities for you too.

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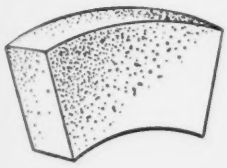
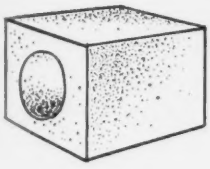




FIRE BRICK

Brand	Type	Fusion Point	Uses
WARCO XXT (Missouri High Heat Duty)	Dedired Stiff Mud	Cone 32-33 (3173° F.)	Metallurgical furnaces where slag and abrasive action is severe. Malleable furnace side walls.
BUNG BRICK (Missouri Super Duty)	Dry Press	Cone 34 (3200° F.)	Malleable furnace roofs.
MULLITEX (Missouri Super Duty	Dry Press	Cone 34 (3200° F.)	Furnaces operating at high temperatures with sudden temperature changes. Malleable furnace bottoms and roofs, non-ferrous furnace linings.
MULLITEX HB (Missouri High Burn Super Duty)	Dry Press	Cone 34 (3200° F.)	Highly resistant to slag, abrasion, shrinkage and sudden temperature changes. Electric furnace roofs ferrous and non-ferrous furnace linings.
APEX (Missouri Extra Duty)	Dedired Stiff Mud	Cone 34-35 (3200-3245° F.)	Wherever high temperatures, slag, abrasion and corrosive action prevail.

Walsh also makes: Cupola Blocks, Tap Out Brick, Slag Hole Block, Ladle Bottoms, High Temperature Ferrous and Non-Ferrous Furnace Linings.

PLASTICS

Brand	Max. Service Temp.	Fusion Point	Packaging	Type	Uses
GRAFLOK (Missouri Super Duty with Graphite Base) (Wet or Dry)	3000° F.	Cone 33-34	500 lb. drums 100 lb. cartons 100 lb. bags	Air & Heat Setting	For ram lining bull ladles, spouts, runners, patching, where molten metal covers and forms seal resulting in longer life, cleaner castings.
K-11 PLASTIC (Wet or Dry)	3200° F.	Cone 36-37	100 lb. cartons 225 lb. drums 500 lb. drums 100 lb. bags	Air & Heat Setting	Withstands electric furnace temperatures and conditions. Excellent for rammed linings, spouts, runners, burner ports, pit furnaces, patching.

CEMENTS

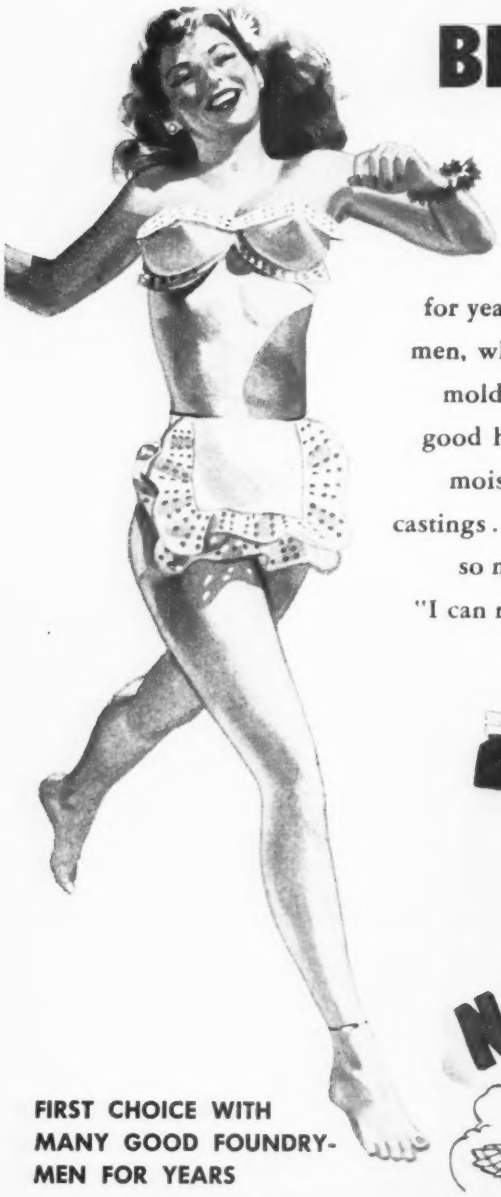
Brand	Max. Service Temp.	Fusion Point	Packaging	Type	Uses
GRAFLOK LADLE COATING (Dry) (Missouri Super Duty with Graphite Base)	3000° F.	Cone 33-34	100 lb. bags	Heat Setting	For brush coating over Graflok Plastic. Affords added protection and longer life.
MULLITEX CEMENT (Wet or Dry)	3150° F.	Cone 34-35	100 lb. bags 200 lb. drums 500 lb. drums	Heat & Air Setting	For laying up and surfacing fire brick subjected to severe joint erosion.
METALOK (Missouri Super Quality Mortar—Dry)	3200° F.	Cone 36	100 lb. bags	Heat Setting	Unusually resistant to slag action—highly suitable for laying up fire brick in malleable furnace sidewalls, ladles, hot metal mixers, electric furnaces, etc.

WALSH
REFRACTORIES CORPORATION
ST. LOUIS MISSOURI U.S.A.

Walsh also supplies the foundry with Fire Clays, Ground Fire Clays, Milled Foundry Clays, Super Duty Plastic Furnace Linings, Castables and other Refractory Specialties.

101 FERRY STREET, ST. LOUIS 7, MISSOURI
FACTORIES: ST. LOUIS AND VANDALIA, MISSOURI

. . . you can always FIGURE on finer castings with better bonded molds— using top quality **NATIONAL BENTONITE**



Consistently high quality National Bentonite has been figured on regularly for years by many expert foundrymen, who demand better molds—molds with high green strength, good hot strength, and minimum moisture content for finer-finish castings . . . fewer rejects. That's why so many good foundrymen say, "I can rely on National Bentonite."

FIRST CHOICE WITH MANY GOOD FOUNDRYMEN FOR YEARS

Quick Service From Better Foundry Suppliers Everywhere

Baroid

Baroid Sales Division ☆ National Lead Company

Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

MEASURE BY WEIGHT INSTEAD OF VOLUME . . .

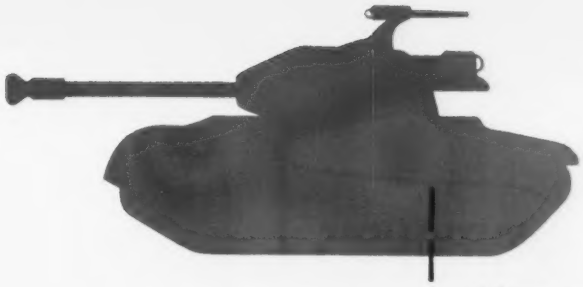
Two important variables to the success of good foundry molding are frequently overlooked . . . proper mixing and proportioning of mold, facing and core sand.

Large amounts of sand and small percentages of other materials make up the sand mix. Some additions are as low as one percent, to add certain physical properties to mold or core sands. Slight changes in proportioning can change the mold characteristics entirely. That's why measuring is so important.

Measuring is done many ways . . . by shovels, gallons, quarts, cubic feet, wheelbarrow . . . or by weight. Needed volumes may vary considerably, depending on the moisture of the sands.

With sand put into the muller, it's time to add other ingredients for a skillfully worked out mix. So Mr. Mixer measures out quarts or gallons of bentonite in a nice clean gallon measure, bumping it between dips in the sack to get, at last, a nice heaping measure . . . perhaps a gallon and a quarter. Multiply this error five or six times and see what it does to proportions. Surprising, too, how many pounds a gallon of bentonite, or any dry binder, will weigh when measured by different operators.

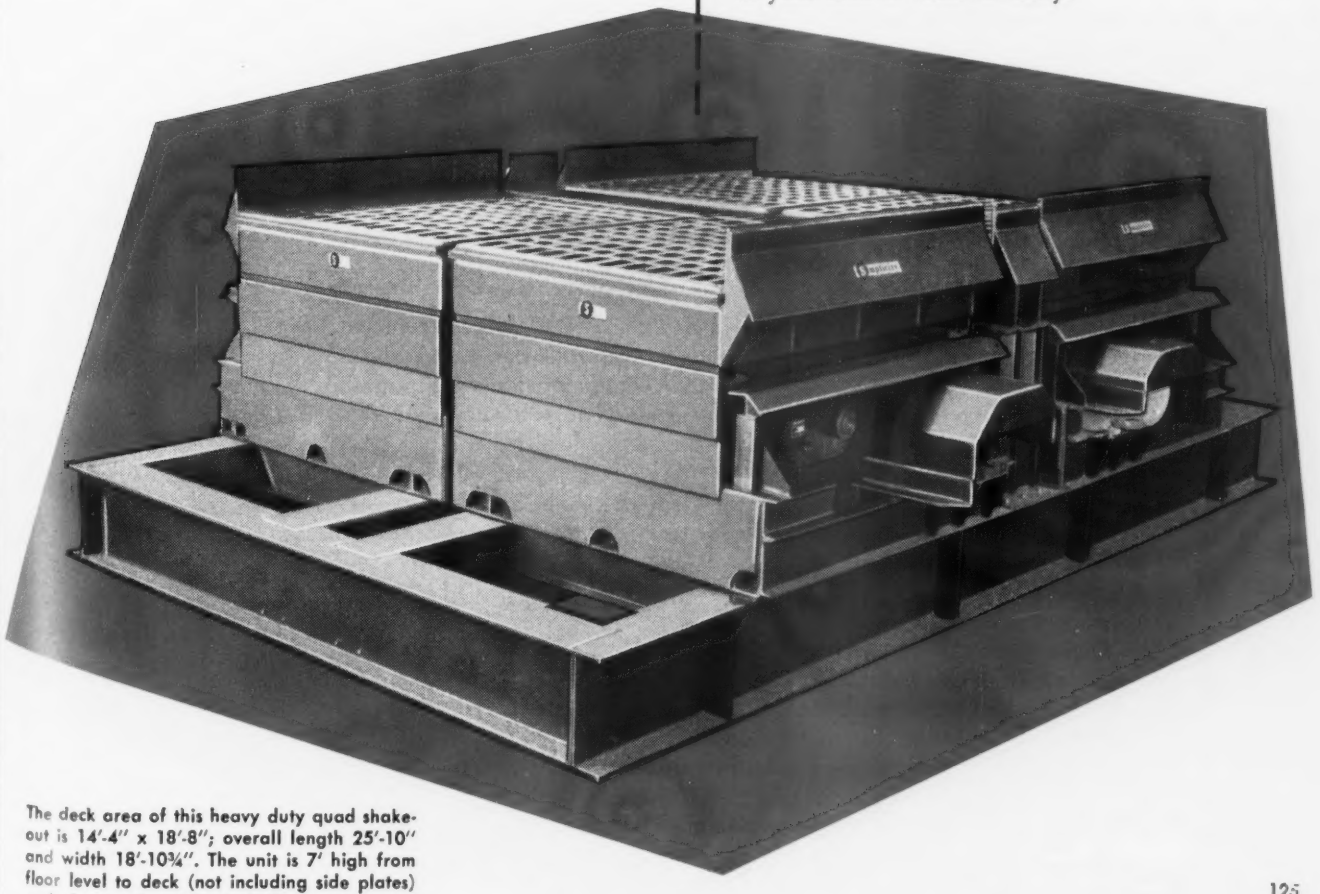
To properly add dry binders, use a scale. It's surprising how closely mixes follow a set pattern when everything is weighed accurately. Time consumed weighing is far less than measuring too, and far less costly, counting failures turned into successes.



Talk about speed!

This powerful Simplicity spring-mounted unit shakes out 65-75 ton flasks in three minutes flat

A large well-known foundry, pouring huge tank hull castings, improved their shakeout operations by installing a Simplicity spring-mounted quad shakeout comprising four 7′ x 8′ steel-decked OM units. Operation is faster and quieter without annoying vibrations. *Positive controlled vertical vibration* eliminates travel of flask or casting. Simplicity Shakeouts do a thorough job in less time because the action is concentrated at the deck. The rigid supporting structure does not vibrate even with a light foundation. Simplicity Spring-mounted Shakeouts are available in all the large sizes for use as single units or in combinations. For complete information, consult the Simplicity sales representative in your area or write us today.



The deck area of this heavy duty quad shakeout is 14′-4″ x 18′-8″; overall length 25′-10″ and width 18′-10¾″. The unit is 7′ high from floor level to deck (not including side plates) and the total weight including motors and sub-frame is 75 tons!

125

Sales representatives in all parts of the U.S.A.

FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

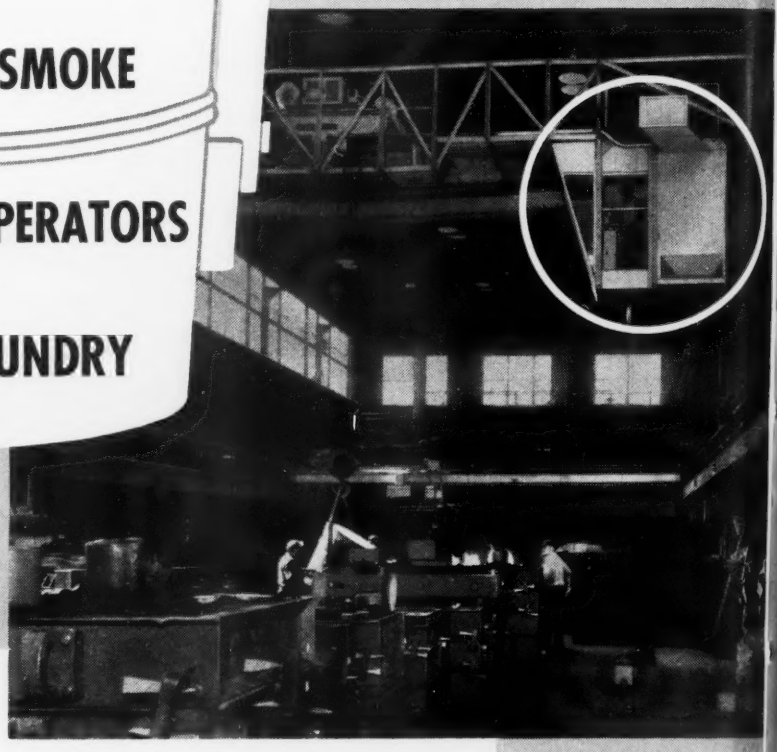
FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N.Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICH.

DRAVO CONDITIONERS ELIMINATE FUMES AND SMOKE

FOR CRANE OPERATORS AT GREENLEE BROTHERS FOUNDRY



Operations in the foundry at Greenlee Brothers & Company had been hampered by excessive smoke and fumes. Smoke, which resulted from burning of residual oil and flour, and fumes from core ovens made it impossible for crane operators to work at maximum efficiency. Installation of Dravo Crane Cab Conditioners eliminated these intolerable conditions, greatly improving the efficiency and alertness of crane operators while safe-guarding their health.

Dravo Crane Cab Conditioners are ruggedly-constructed ventilating units, fabricated specifically for rough industrial usage and are especially designed for conditions which require fume removal. These units provide a continuous supply of air from which dust and dirt has been removed. Electric strip heaters maintain temperatures of 68° to 72° F. in crane cabs during winter months.

These units can be easily installed vertically, horizontally, or at any angle which space permits. A separate control cabinet allows on-off operations and regulates heat. Dravo Crane Cab Conditioners are also ideal for installation on mobile cranes, pulpits and other equipment operating where similar conditions exist.

Only Dravo has a complete line of crane cab coolers and conditioners. All units are available now! Write or phone your nearest Dravo office today for more information and have our representative call on you. Ask for Bulletin No. PS-130

DRAVO

DRAVO CORPORATION

Dravo Building, Fifth and Liberty Avenues
Pittsburgh 22, Pa.

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For Foundry Practice —

- DOMESTIC & AUSTRALIAN ZIRCON FOUNDRY SANDS
- ZIRCON FOUNDRY FLOURS IN 200 AND 400 MESH PARTICLE SIZES

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- **FREDERICK B. STEVENS, INC.**, Detroit; Buffalo

HERE'S YOUR ANSWER

to faster, better, uniform, low-cost blast cleaning

IN A NUTSHELL

That's a broad claim. We don't expect you to accept it without substantiation. We hope you will ask us to present our proof. All we ask, is that you let it be on-*your*-job proof. Proof we know you'll believe! The only proof we want you to accept.

Like many production finishing men, perhaps you have always taken shot and grit pretty much for granted. If so, you have a surprise coming, for Hi-Grade Shot and Grit IS different—so superior, in so many ways—you can only appreciate its true value by job-testing the material yourself. That way you get proof of performance you can accept as conclusive. Order a trial quantity today. We'll let results speak for themselves. You'll find they say, "*Hi-Grade is best by test*"—your answer to faster, better, uniform, low-cost blast cleaning, in a nutshell.

Packed in 100 lb. Bags—Ready For Immediate Shipment

YOU GET TO THE MEAT OF HARD-TO-CRACK BLAST CLEANING PROBLEMS FASTER WITH

HI-GRADE SHOT AND GRIT

- **YOU GET MORE EFFICIENT PEENING AND CLEANING.** Hi-Grade Shot and Grit is uniform, especially processed to withstand repeated strain, stress and wear.
- **YOU GET MORE FOR YOUR BLAST CLEANING DOLLAR—LESS WASTE.** Hi-Grade Shot is famous for its lack of hollows, tails and irregular shapes which do no good, yet cost money. Hi-Grade Grit is free from dust fines and scale. This alone, saves you up to 20% in actual cost *before you even use Hi-Grade Shot and Grit.*
- **YOU GET A LOWERED COST PER TON OF CASTINGS CLEANED** because Hi-Grade Shot and Grit has a longer re-use value. Special alloying and tempering process minimizes impact fractures.

HI-GRADE SHOT AND GRIT MORE THAN MEETS S.A.E. SPECIFICATIONS—SCREENED AND GRADED FOR 100% USAGE

Clayton-Sherman *Abrasives Company*

MANUFACTURERS OF *QUALITY-CONTROLLED* SHOT AND GRIT

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Now! TOCCO* Induction Melting Furnaces for Precision Casting

One of the TOCCO Induction Melting Furnaces used at Arwood Precision Casting Co. Note TOCCO control station in background.

● Engineers at Arwood Precision Casting Co. use TOCCO Induction Melting Furnaces for melting and remelting quality steel. Other companies have found TOCCO equally adaptable for melting non-ferrous metals. No wonder! *Look at the advantages:*

- ★ Stepless power control
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- ★ High Efficiency on Intermittent Operation
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- ★ Extremely Low Alloy Loss
- ★ No Carbon Pick-up
- ★ No Contamination when Composition of Charges is Changed
- ★ High Reproducibility of Results
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- ★ Simple, Safe Operation
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If any of these advantages suggest economies in your operations write for full details—no obligation, of course.

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(SHOT AND GRIT)

MALLEABRASIVE Outsells All Other Premium Abrasives
Sold and Recommended by America's largest manufacturers of blast cleaning equipment
The Original Premium Abrasive
MALLEABRASIVE

*U.S. Patent # 2184926 (other patents pending)

World's Largest Manufacturers of Malleablized

PACE-SETTER FOR PROGRESS IN FOUNDRY BLAST CLEANING

The most important contribution to foundry blast cleaning since the introduction of airless blast cleaning equipment

In no other phase of foundry operation has more important progress been achieved than in blast cleaning of castings. Two factors have been responsible—

- ***The adoption in the past 20 years of modern high-speed, big-production, airless types of blast cleaning machines.***
- ***The introduction in 1939 of MALLEABRASIVE—the first major improvement in metal abrasives made since the turn of the century.***

AIRLESS blast cleaning equipment . . . employing the principle of throwing abrasive at high velocity by means of centrifugal force . . . offered new, high potentials in tonnage of cleaned castings, in thoroughness of cleaning and in reduction of blast cleaning costs. *It was limited only by the ability of abrasives to withstand the grueling, abrasive-destroying action of high-velocity service.*

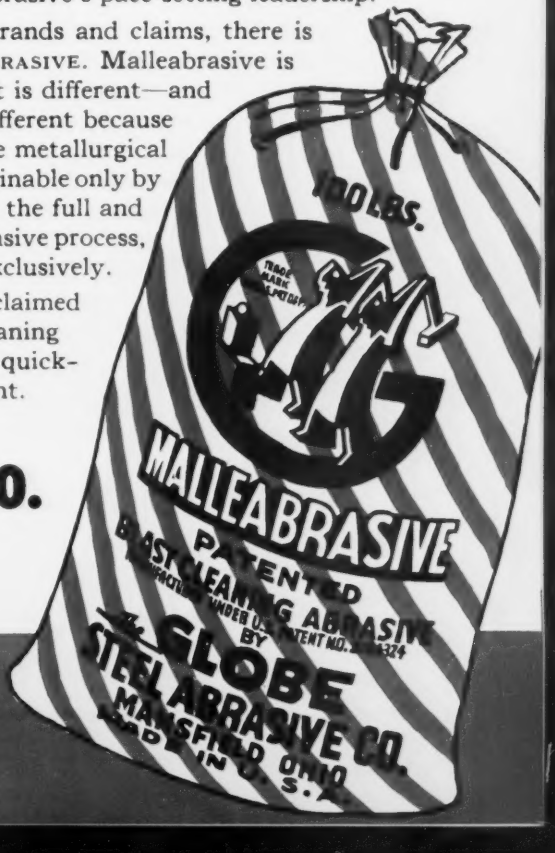
MALLEABRASIVE removed that limitation. It met that need for better abrasive—met it sensationally—so sensationally that it literally revolutionized all conceptions of blast cleaning costs. In plant after plant, carefully recorded production test runs of 30, 60 and 90 days duration showed savings in over-all blast cleaning costs of 50% and more with Malleabrasive . . . as compared with operating costs for ordinary abrasives, some of them purchased at half the first cost of Malleabrasive.

MALLEABRASIVE became the foundry industry's sensation of the forties. It's contribution to progress of the industry has been *measured literally* by millions of dollars saved by the industry in blast cleaning costs by reason of its use.

The success of Malleabrasive inspired others to improve their abrasives, and to bring out new products. New names, and many claims of "just as good as Malleabrasive" appeared—sincere tributes to Malleabrasive's pace-setting leadership.

Among all the brands and claims, there is only one MALLEABRASIVE. Malleabrasive is patented because it is different—and Malleabrasive is different because of its own exclusive metallurgical characteristics obtainable only by manufacture under the full and complete Malleabrasive process, used by ourselves exclusively.

Malleabrasive's claimed savings in blast-cleaning costs can be proved quickly in your own plant.



THE GLOBE STEEL ABRASIVE CO.

Established 1907

MANSFIELD, OHIO

Chilled Iron Shot and Grit

MATCH PLATE BUYERS WHO SCOUT AROUND Know

THEY CANNOT FIND BETTER MATCH PLATES THAN——

SCIENTIFIC MATCH PLATES
Pressure Cast

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Write for Bulletin

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1390 East 40th Street
CLEVELAND 3, OHIO

2520 West Lake Street
CHICAGO 12, ILLINOIS

Readers' Comment

Articles Useful to Student

TO THE EDITORS:

As a student at the University of Notre Dame and interested in foundry work, I want to congratulate you and thank you for presenting articles of the very best calibre. They are articles which help an inexperienced student to have a better understanding of foundry practices and problems before he enters the foundry field. The advantages from this fact are unsurpassable.

In particular, the article in FOUNDRY's February 1953 issue entitled "Patterns—Their Relation to Castings Production," Part IV, by T. H. Trevithick was especially beneficial to me. I would appreciate it if you would kindly send me a copy of this article so that I may save it and use it for further study.

Thank you very much.

JOSEPH T. STADLER
Notre Dame University
South Bend, Ind.

* * *

Ford's Cleveland Foundry

TO THE EDITORS:

I would like to commend the staff for the excellent article on the new Ford foundry in the March issue of FOUNDRY. It was one of the most complete and well written presentations I have ever read and you should be mighty proud of it.

FRANK W. SHIPLEY
Foundry Manager
Caterpillar Tractor Co.
Peoria 8, Ill.

●

TO THE EDITORS:

I think you did a wonderful job in the March issue covering the description and illustration of the Ford Cleveland Foundry; and I also feel your editorial is outstanding. I enjoyed both very much.

A. J. RUMELY
President and Treasurer
LaPorte Foundry Co.
LaPorte, Ind.

* * *

Sees Changes in the Industry

TO THE EDITORS:

Many thanks to you for your kindness in sending an old timer the February issue of your fine magazine. I certainly will get a lot of enjoyment from it. I have looked all through it already, and there must have been quite a lot of changes since I retired six years ago.

Starting with the 1920 convention at Columbus, I didn't miss many conventions, but I didn't recognize many of my old friends in the pictures. I sold foundry supplies at one time for the Hill & Griffith Co.

ALBERT SHEPHERD

Box 329
Granby, Mo.

* * *

This Is the Foundry Industry

TO THE EDITORS:

This is just a short note to let you know I think your recent foundry publication, "This Is the Foundry Industry," which is being circulated through the FEF is a mighty fine piece of work. I take this opportunity to congratulate you and your staff on its format and context. You may be pleased to know we are using it in Foundry Engineering here at MIT.

HOWARD F. TAYLOR
Professor of Metallurgy
Massachusetts Institute of Technology
Cambridge 39, Mass.

* * *

Principles of Risering

TO THE EDITORS:

I wish to thank you for the opportunity to submit a list of my key men who should be interested in reading a copy of the new Cleveland Ford Foundry issue.

In your February issue you have an article by Charles F. Walton: "The Principles of Risering," which I found to be the best piece of literature written on that subject, and wonder if reprints of that article are available.

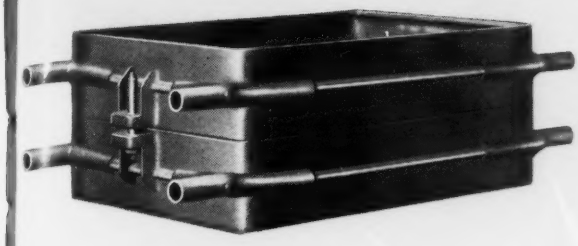
A. J. CASSISTA
Manager
Rollstone Foundry Inc.
Fitchburg, Mass.

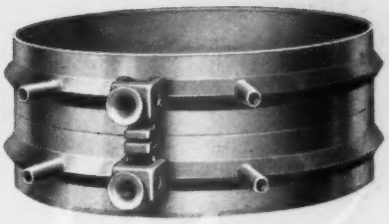
●

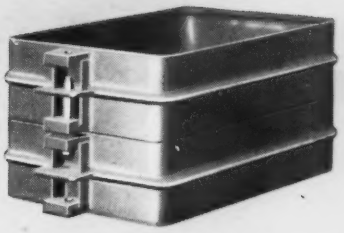
TO THE EDITORS:

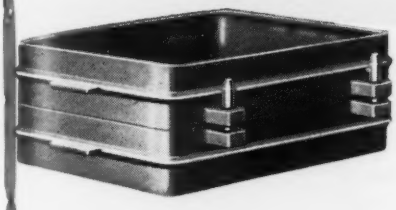
We read your article on "The Principles of Risering," in the February, 1953 issue of FOUNDRY, with a great deal of interest. We would appreciate receiving ten reprints.

N. D. BRINKMANN
Project Engineer
Process Development Section
General Motors Corp.
Detroit 32

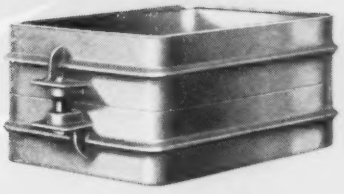


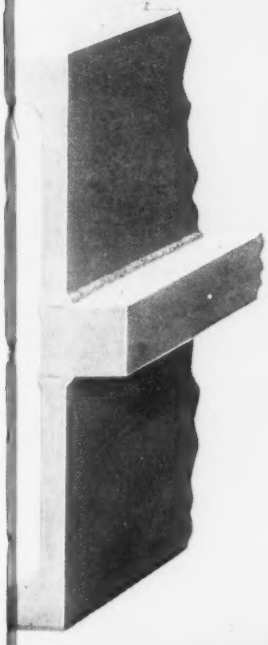






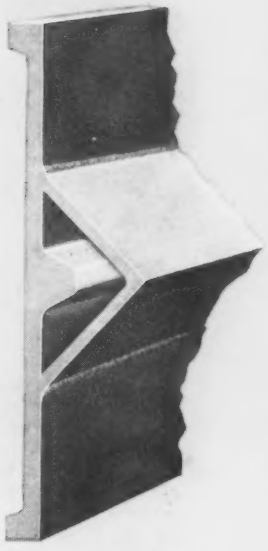
Sterling





MEANS EVEN MORE IN CONNECTION WITH FOUNDRY EQUIPMENT THAN WITH SILVER

For almost a half century, the name "Sterling" has been associated with the very highest quality in foundry flasks. Here's why: Every Sterling Flask is carefully fabricated from special hot rolled channel steel having a tensile strength of 70,000 lbs. The steel also has controlled carbon content and copper bearing . . . features that add years to the life of the flask. This construction gives you the practical combination of maximum strength with minimum weight. It assures accuracy and speed in molding. Each rolled steel section, equipped with welded fittings, forms a solid, rigid piece. A heavy reinforcing rib is rolled in the center of each section to resist torsional and other strains. The heavy rolled steel sand flanges have square corners and full width bearing. Partings are accurately machined, not just surface ground. And there's plenty of metal left for re-machining if necessary. Frankly, can you think of any other foundry flask that gives you so many life-prolonging features?



You Will Find Sterling Steel Flasks in More Than 13,000 Foundries, All Over the World

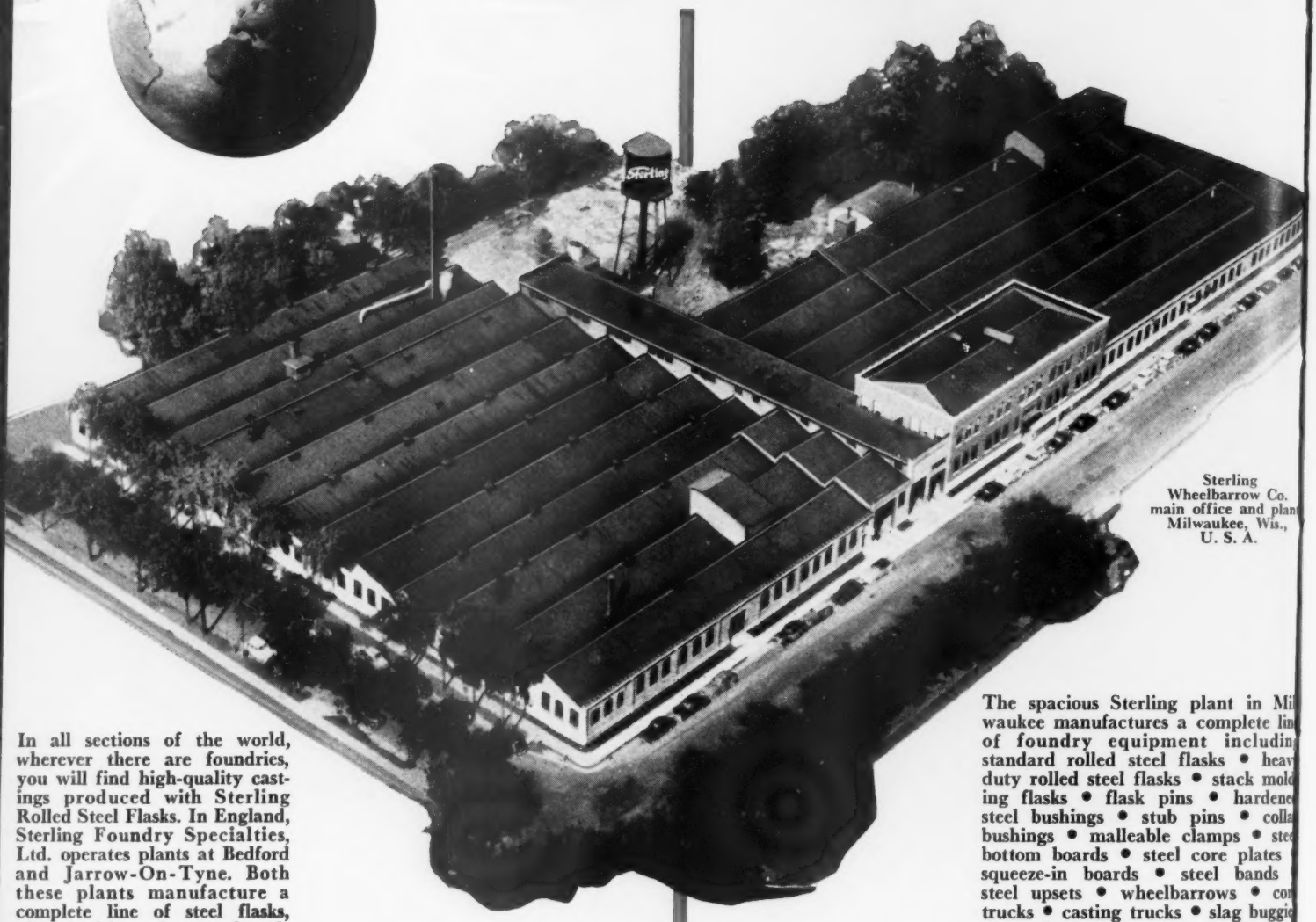
STERLING WHEELBARROW COMPANY

Main Office and Plant, Milwaukee 14, Wisconsin, U. S. A.

Subsidiary Company **STERLING FOUNDRY SPECIALTIES LTD., ENGLAND**

Sales Offices at London and Bedford — Factories at Bedford and Jarrow-On-Tyne

The Sun Never Sets on Sterling

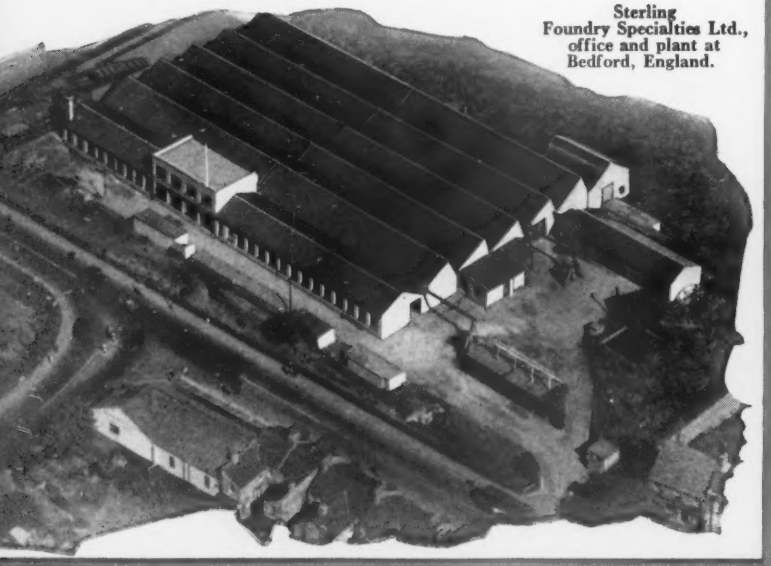


Sterling
Wheelbarrow Co.
main office and plan
Milwaukee, Wis.,
U. S. A.

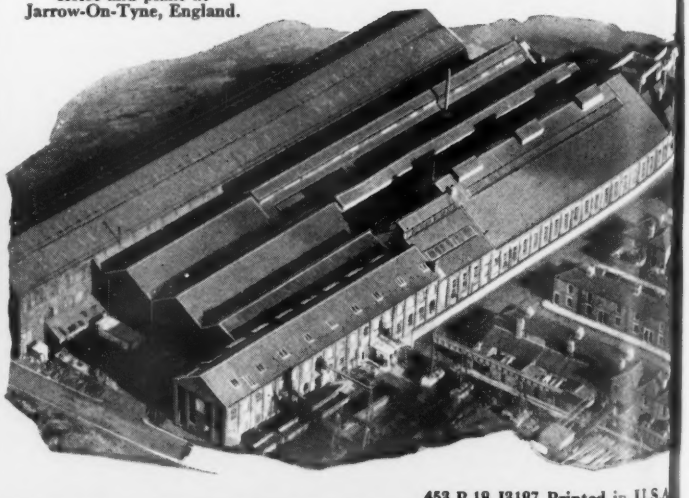
In all sections of the world, wherever there are foundries, you will find high-quality castings produced with Sterling Rolled Steel Flasks. In England, Sterling Foundry Specialties, Ltd. operates plants at Bedford and Jarrow-On-Tyne. Both these plants manufacture a complete line of steel flasks, pins, bushings, bottom boards and core plates.

The spacious Sterling plant in Mi
waukee manufactures a complete lin
of foundry equipment includin
standard rolled steel flasks • heav
duty rolled steel flasks • stack mold
ing flasks • flask pins • hardene
steel bushings • stub pins • colla
bushings • malleable clamps • ste
bottom boards • steel core plates
squeeze-in boards • steel bands
steel upsets • wheelbarrows • co
trucks • casting trucks • slag buggie
• casting carts • steel wheels
casters. Write for new Foundry Equip
ment Catalog No. 64A.

Sterling
Foundry Specialties Ltd.,
office and plant at
Bedford, England.



Sterling
Foundry Specialties Ltd.,
office and plant at
Jarrow-On-Tyne, England.



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STERLING WHEELBARROW COMPANY

Main Office and Plant, Milwaukee 14, Wisconsin, U. S. A.

Subsidiary Company STERLING FOUNDRY SPECIALTIES LTD., ENGLAND

Sales Offices at London and Bedford — Factories at Bedford and Jarrow-On-Tyne

Let's Change Our Thinking

During the past few years many business analysts have been studying probable future trends in the American economy, and the results have been most encouraging. Interesting predictions to industry are found in the report of the President's Materials Policy Commission published last summer under the title "Resources for Freedom." Looking at the probable economic picture in 1975 while using 1950 production records as a base, the commission believes that, over the 25-year period, the population of the country will increase 27 per cent, the labor force will grow 27 per cent, but the gross national product will pyramid 100 per cent.

Predictions of growth of the foundry industry are startling. A 62 per cent increase in castings production by 1975 is indicated, the increase paralleling the estimated expansion in rolled steel production. Since total production of ferrous and nonferrous castings in 1950 was 16,314,000 tons the estimated castings market in 1975 would be 26,429,000 tons.

To reach this goal provides a tremendous challenge for every company producing castings. Can the industry meet this challenge successfully? The answer depends upon the ability of many foundrymen to change attitudes and practices of long standing. They must keep up with progress in castings.

Too many foundries are not making full use of the available storehouse of modern technical and practical knowledge. Some have not recognized that producing quality castings in disorderly surroundings is next to impossible. Many are not taking the lead in assuring safety in their plant. Some have yet to realize the importance of being a good neighbor. Some are so bound by tradition and inertia that they resent the intrusion of new machines, materials or processes which might open new opportunities for the industry. As a result of these and other indifferences to the march of progress, buyers of castings at times complain of lack of quality, lack of service and a general neglect of modern merchandising methods.

On the other hand, many foundries are doing a fine job in both production and selling. They are supplying a quality product, maintaining excellent customer relations and keeping the backing of employees and the community. As we move into the future, with its growing competition for business, these progressive foundries will get the lion's share of the expanding market. Tradition and indifference will cause others to fall by the wayside.

It will take modern management, modern plants and modern practices to sell and produce those 26 million tons of castings in 1975.

Frank G. Steinbach

Editor

PROGRESS INC

PROGRESS of an industry may be measured by various yardsticks. It may be evaluated in terms of volume of production, quality of product, operating practices, plant facilities, or employment opportunities and working conditions. It may also be judged on the basis of the industry's contributions to the general welfare in times of both peace and war.

On all of these scores the foundry industry has made tangible progress since the end of World War II nearly eight years ago. What is equally important —if not more so—is that the benefits of many of the significant advances in recent years have only begun to be felt. This provides strong support to the belief that, in the years to come, castings will strengthen their age-old position as one of the most important basic engineering materials.

Production—The accompanying table shows the trend in shipments of castings since the war. In several instances—notably gray iron, malleable iron and aluminum—shipments in recent years exceeded wartime peaks. Magnesium castings would be included in this classification if the incendiary bomb castings which swelled the wartime totals for that metal, were disregarded.

Demand for castings depends more upon the activities of foundries' customers than upon the brand-new markets that foundries can create for their products. Consequently, it is to be expected that casting shipments would rise during a period of expanding production among manufacturers of automobiles, farm implements, machinery, household appliances and other consumers, such as has been experienced in the postwar period.

But the important consideration in determining whether cast products are gaining or losing ground to competitive materials is: How closely has the trend of casting shipments followed that of general industrial activity? This can be measured in several ways.

Castings vs Steel — Here's how foundry activity ranks with that of the steel industry. The tremendous expansion in steelmaking capacity in recent years was accompanied by an all-time record ingot production in 1951 of more than 105 million tons. This was an increase of 45 per cent over 1946 output. Shipments of castings in 1951—also the record year to date—were 44 per cent larger than in 1946.

Last year's strike cut steel ingot production 11½ per cent from the 1951 total. This was practically paralleled by casting shipments, which dropped 13 per cent in 1952. It is axiomatic that the tempo of industry as a whole affects rolled steel and castings alike, and in recent years the ratio of finished steel shipments to casting shipments has held consistently at slightly more than four to one.

Activity of all industries offers the basis for another comparison. Index of industrial production, as compiled by the Federal Reserve Board, showed an increase in 1951 of less than 30 per cent over that of 1946. The gain for castings was 44 per cent. In 1952 the index was 28 per cent ahead of 1946, compared with a 25 per cent increase for castings. The latter figure undoubtedly would have been larger had it not been for the steel strike.

Products and Processes—It is perhaps only natural that the technical developments which have attracted the greatest interest among foundrymen the last few years have been such subjects as nodular iron, shell molding and the basic-lined cupola. These developments have commanded wide attention because they represent a definite departure from long accepted materials and practices, and seem to have possibilities of influencing the industry markedly in the years ahead.

At the same time, the sum of the less well known

Annual Shipments of Ferrous and Nonferrous Castings the last Seven Years

(Figures in net tons reported by the Bureau of the Census)

Year	Gray Iron	Steel	Malleable Iron	Copper-Base Alloy	Aluminum	Magnesium	Zinc	Total
1946	10,269,657	1,432,049	752,028	532,798	194,355	4,236	192,350	13,377,473
1947	12,540,960	1,625,055	895,054	525,871	220,998	3,845	218,204	16,029,987
1948	12,785,909	1,759,127	933,265	515,412	212,245	4,107	222,477	16,432,542
1949	10,549,284	1,243,502	713,330	362,026	152,204	4,182	188,889	13,213,417
1950	12,905,562	1,459,382	920,502	528,486	226,321	6,157	268,199	16,314,609
1951	14,988,555	2,050,054	1,085,241	588,770	275,216	16,567	247,475	19,251,878
1952	12,860,155	1,925,203	926,120	498,318	286,165	18,710	213,960	16,728,631

CASTINGS

By WILLIAM G. GUDE, *Managing Editor*

recent developments in materials, methods and equipment has been of greater influence than the more highly publicized discoveries in raising the quality of castings as a whole. These advances are detailed in the articles presented on the following 32 pages in which the progress and prospects for the individual foundry industry branches are discussed.

Machines Take Over—Widespread modernization and mechanization of foundries the last ten years has increased production per man-hour and curtailed manual effort, but its by-product in many cases has been a higher quality product. For instance, the molding machine that depends upon mechanical devices instead of the human element can develop a uniformity in molds that is not ordinarily duplicated by manual methods.

The extent to which molding machine design has progressed toward automatic operation is evidenced in latest models which have supplanted the one-time art of molding with the mere requirement of the pushing of a button. Much the same is true of coremaking machines. Improvements in a wide variety of equipment used in other foundry operations have been equally noteworthy and have contributed substantially to the more efficient production of better castings.

Basic Knowledge Accumulating—Intensive study of foundry fundamentals by individual companies and foundry organizations has produced beneficial results. There is increased knowledge of the type of molding sand and binder best suited for particular types of work. Additional information has been acquired concerning the use of mold and core washes. Employment of resin binders has grown, in some cases accompanied by dielectric baking of cores, a process resulting in a decrease in baking time.

Study of the flow of liquid metal—particularly by the American Foundrymen's Society, Steel Founders' Society of America and the Naval Research Laboratory—has proved helpful in the design of gates, sprues and runners, with ultimate improvement in the resulting castings.

Application of quality control programs in recent years has been an important factor in permitting numerous foundries to improve the uniformity of their products. This practice, common to many industries, offers considerable promise of providing an effective means of keeping in line the many variables with which foundries must contend.

What of the Future?—It seems safe to say that the foundry of the future will be unlike the foundry of the past in numerous respects. A transformation has been taking place for a number of years, and this trend should receive additional impetus from the latest developments in materials, equipment and processes.

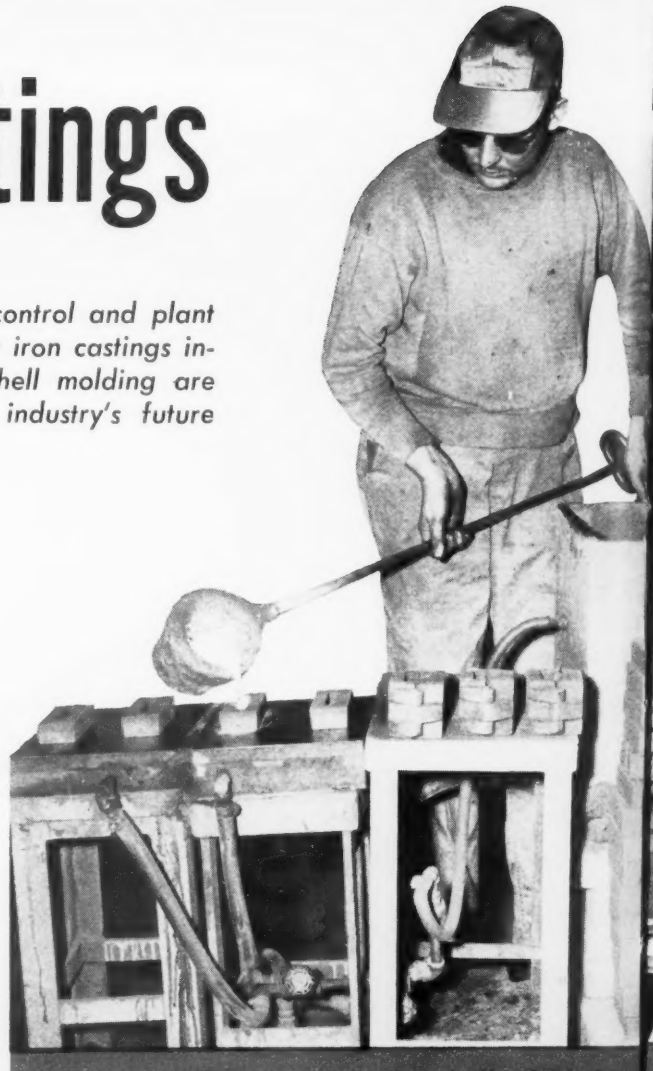
At the same time there are indications that additional advances, now in the experimental stage, could well have a significant influence on future foundry practice. It is still too early to predict the ultimate impact of shell molding on casting operations, but while the process seems assured of a definite field in the foundry, it is interesting to note that it, in turn, has stimulated investigation of other new practices and the improvement of older methods.

Another trend that augurs well for the industry is the increasing application of engineering and scientific treatment to foundry problems. One of many examples of this is the success that has marked the few years during which the Foundry Educational Foundation has been in existence. In fact, this engineering approach to the design and production of castings will, in general, be the distinguishing feature between the foundry artisan of the past and the casting manufacturer of the future.

Gray Iron Castings

Improved sand and metal technology, better cupola control and plant modernization are among major advances in the gray iron castings industry. Nodular iron, the basic-lined cupola and shell molding are leading developments seen likely to influence the industry's future

By CHARLES O. BURGESS
Technical Director
Gray Iron Founders' Society



Lynchburg Foundry Co.

Chill samples are a valuable tool in cupola control

GRAY iron castings are produced in prodigious yearly quantities varying from 10 to 15 million tons. They constitute over 80 per cent of all cast ferrous products. They are essential components in the thousands of assemblies necessary to sustain our nation's food, transportation, electrical, chemical, machine tool, and general manufacturing industries. The volume of castings has increased in accordance with national industrial expansion the last six years, and percentage-wise has equaled, and in some years exceeded, the growth in rolled steel capacity of the country.

It is of interest that, contrary to opinion in some quarters, this modern growth of the gray iron casting industry is at least as great as that exhibited by other fabricating processes such as welding, and more than matches the increased use of nonferrous castings. Successful maintenance of the competitive position of gray iron is the more remarkable in view of the fact that the production of gray iron is to some degree embedded in the traditional or art stage rather than science stage as regards an appreciable number of both gray iron casting producers and users of such castings. These are handicaps that the comparatively young rolled steel industry has never had to face, and they are only now being slowly but surely eliminated from the gray iron picture.

In estimating factors responsible for the growth and development of the gray iron industry in the last six years, it must first be realized that gray iron castings are produced in thousands of independent foundries varying from small to large units, usually individually or family owned and resistant to regimentation even as concerns methods of production. There is, consequently, no question that the increasing ability of the gray iron industry to meet modern engineering demands and to develop technically, is due to the vision and initiative of management executives both as individuals and as bonded together in trade associations such as the Gray Iron Founders' Society.

Mechanical Equipment—One of the most evident signs of this alert attitude by foundry operators has been the steady increase in use of mechanical handling equipment. This revolution in the foundry industry began in large automotive foundries a number of years ago, but only in recent years has foundry management been able to effectively translate the highly efficient belt and loop operations to the jobbing foundry. This trend was at an ever increasing tempo during the last six years. Improvement in mechanical equipment has meant not only a decrease in the heavy hand labor required in the foundry and consequently better working conditions, but it has also been effective in improving the quality and generally reducing the cost of castings to the final consumer.

In addition to materials handling equipment, mention also should be made of improved molding and core blowing machines. At the insistence of foundry operators, there have been very decided improvements in these molding machines as concerns both (1) the speed with which the molds can be produced, (2) the accuracy with which they duplicate the final dimensions required in the casting, and (3) the uniformity of the final mold or core as concerns its

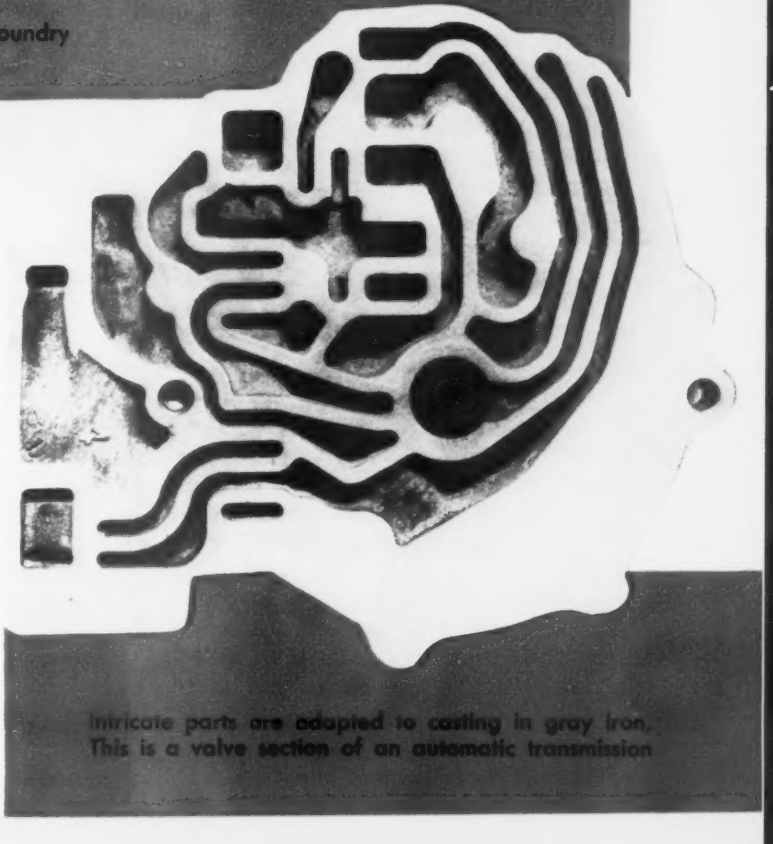
National Engineering Co.

Materials handling equipment in a modern gray iron foundry

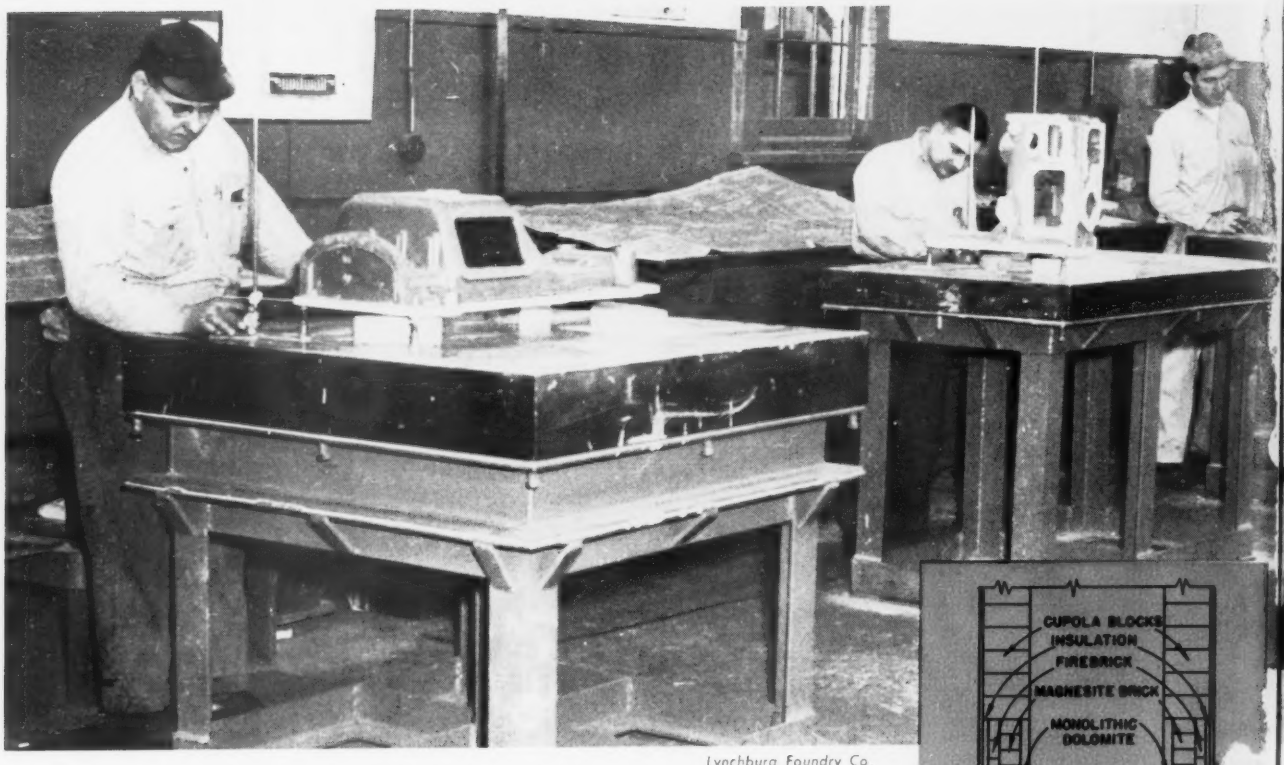
hardness, permeability, strength, etc. This mold improvement is not only the purely mechanical one brought about by better machines, but has also involved improvement in the apparatus used in sand preparation and molding-sand reclamation.

Mechanization has focused attention on the development of efficient foundry layouts. To an observer one of the most striking changes in foundries during recent years has been their adoption of a floor design that permits an uninterrupted flow of raw materials to finished castings with minimum handling and transportation.

Sand Technology—One of the technical advances that must be recognized is the increase in understanding of the type of molding sand and binder best suited for a particular job, and realization by management that special sand preparation procedures and testing are needed to assure its uniformity when finally rammed into molds. Much still remains to be learned in this field but development of automatic moisture control of sand, correct use of a wood-flour to prevent casting defects, and the use of special

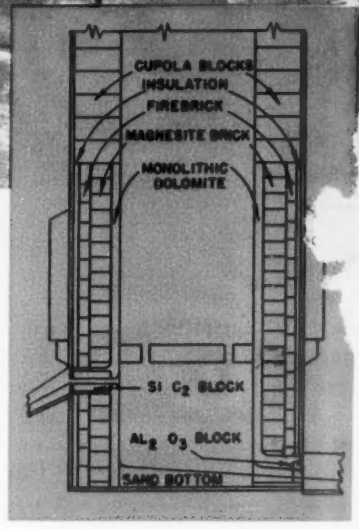


Intricate parts are adapted to casting in gray iron. This is a valve section of an automatic transmission



Lynchburg Foundry Co.

Making periodic dimensional checks on production gray iron castings



Cross-sectional view of a basic-lined cupola showing types of refractories employed

coated sands, coupled with systematic recording of resultant moisture, permeability and strength of the molding sand at the muller itself, have in a number of cases decidedly reduced defective castings.

This advancement in sand technology is particularly significant not only as concerns the elimination of defective castings, but in improving surface finish and simplifying cleaning operations, all of which guarantee a better product and a less costly one to the consumer.

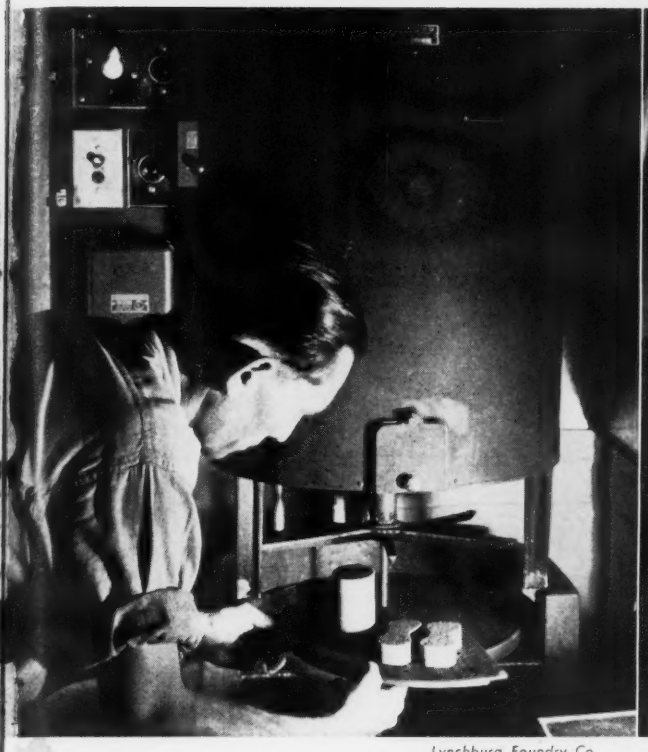
Before leaving this subject of sand improvement, two developments, largely within the last six years, should be noted. One of these is the expansion in use of phenol formaldehyde resins in large cores, sometimes augmented with dielectric baking of such cores, which has in a number of cases improved dimensional control and decreased baking time. Recent use of green sand molds of unusually high hardness to assure dimensional stability has also shown promise.

Metal Technology—There has been an increasing appreciation in the gray iron industry of the necessity for close control of the composition and structure of gray iron. This realization has been intensified by the greater engineering demands placed on the material. It is being more broadly recognized that in certain applications gray iron of guaranteed physical properties can be used in place of other metals with benefits from both operational and economy viewpoints. In turn it has been realized by the foundry industry that consistent control of the metal is essentially bound up with the available raw materials and with cupola practice.

There is an increasing understanding that scrap entering the cupola must be selected carefully and that precautions such as proper stripping of motor blocks must be carried out to avoid contamination of the metal with tramp elements. As far as the cupola operation itself is concerned the importance of (1) the general metering of the air blast, (2) the proper physical construction of the cupola itself, (3) the use of hot blast, (4) mechanical charging with cone or orange peel buckets to assure proper bed and charge conditions in the cupola, and (5) careful coke handling and sizing, has been largely realized within the last six years.

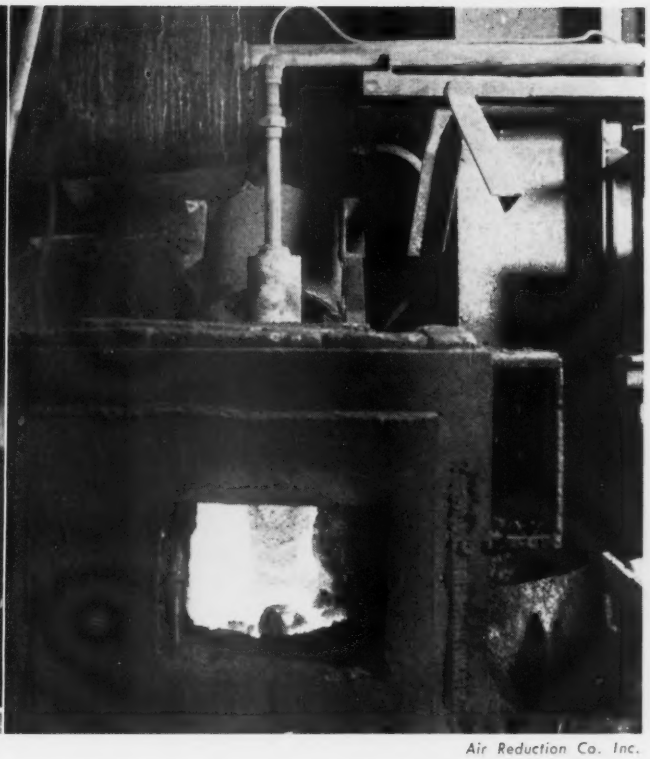
The use of guns to restore the burnt-out refractory lining of cupolas has broadened markedly and helps to maintain uniform melting conditions. There is no question that the general level of understanding of cupola operation and control has also benefitted from experimentation with the basic-lined cupola. However, since only some 55 out of approximately 3000 cupolas in existence currently are using basic practice, this subject will be considered under the section on future trends in gray iron.

As concerns the control of chemical composition of gray iron, the need for periodic chemical analyses as well as chill tests of each ladle of molten iron has been realized by most operators. There is a very definite trend for even the smaller foundries to have personnel available who maintain the proper metal-



Lynchburg Foundry Co.

erimental work has added to sand technology



Air Reduction Co. Inc.

Injecting calcium carbide in cupola forehearth

urgical conditions and understand the place of alloying elements and inoculants in the production of a casting to specific engineering standards.

At the same time there have been fundamental studies going on as concerns the proper gating and risering of gray iron castings and how proper feeding affects casting design. These studies, some of which have been in the nonferrous field but which can often be directly related to gray iron, have already made themselves felt as regards casting improvement.

Quality Control—Perhaps one of the most important developments the last six years is the application of principles of quality control to the production of gray iron castings. A number of foundries on their own initiative have installed a quality control man or department. The Gray Iron Founders' Society has actively undertaken the job of expanding and correlating quality control procedures for the whole foundry industry.

This quality control program will eventually extend into all the production phases of gray iron as well as final inspection and co-operation with casting users in their own plants. Foundry quality control is already effective and its further development will obviously contribute to a reduction in casting cost to both producer and consumer and at the same time assure the highest possible quality in the cast products themselves.

Until the last four or five years the gray iron industry, subdivided as it is into a number of small units, has made no concerted effort to bring the engineering and economic advantages of gray iron to the attention of engineers and designers. Within the last five years, however, the Gray Iron Founders' Society has instituted a definite program to point out the specific technical advantages of the industry's product. This has been done through national advertising and more specifically through the issuance of a series of technical manuals. One of these treats the functional and economic advantages of the casting process and of gray iron specifically. A second manual describes the types of metallic and nonmetallic coatings available and application methods to gray iron to improve corrosion resistance, wear resistance, heat resistance and appearance.

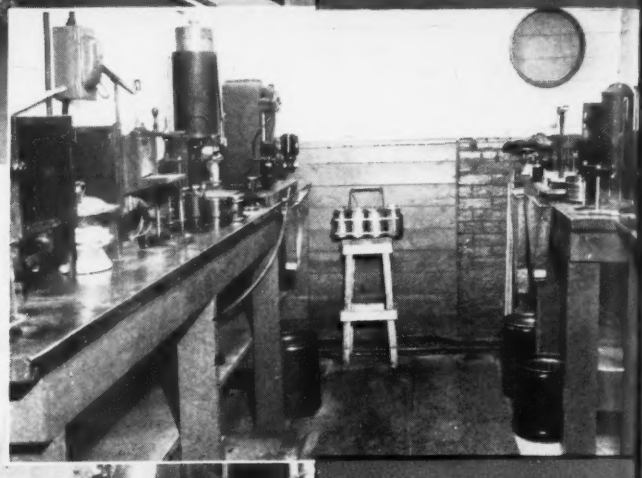
A third manual describes methods of welding, joining and cutting of gray iron and has been the basis of acceptance of gray iron by the American Welding Society and others as a weldable material when the necessary precautions are employed. Still another manual on the heat treatment of gray iron is in preparation which will define new engineering fields made possible by the use of heat-treated gray iron castings. Thousands of copies of these manuals have already been distributed to industry, and the manual series will eventually encompass all the technical information necessary in the broadest commercial application of gray iron.

Future Prospects of the Industry—Three basic developments in the gray iron field are now in process and will influence the whole future of the industry. These developments are shell molding, basic cupola melting including carbide injection, and nodular iron. In no other metal field, ferrous or nonferrous, are revolutionary developments of equal scientific significance being carried forward.

Shell Molding—One of the most interesting developments is the new process of casting gray iron into thin molds made of a sand-resin mixture. These molds, normally varying from about 3/16 to ¼ in. in thickness, are produced by dumping a fine sand mixed with about 5 to 7 per cent of a thermosetting phenolic

Improved quality is being maintained in the modern coreroom reflects to a large extent control exercised in the sand laboratory

Superior Foundry Inc.



Magnesium alloy being added to the ladle in producing ductile iron

International Nickel Co. Inc.

resin on a heated metallic pattern. A thin shell of the sand and resin mixture adheres and hardens against the metallic pattern, and after being baked briefly to assure development of full strength, the shell mold is stripped from the metal pattern. Under certain conditions advantage can be taken of the very good surface finish and very close tolerances of the order of 0.001 to 0.003-in. per inch with such molds. In some cases it is also possible because of the high permeability of the final shell molds, to reduce defects, particularly in thin-section castings.

Although the process has certain disadvantages, particularly as concerns cost of the equipment and raw materials, it has already found use in the production of crankshafts, gears and other parts where savings in machining costs can be effected. Although it is not believed that shell molding will generally replace sand molding, it is considered that this production method will in the future permit gray iron to win back certain components that are now in the form of forgings, aluminum die castings, and machined steel assemblies. Future developments will be in the direction of more economical production equipment, reduction in the quantity of relatively expensive resin,

improvement in wettability of the molds, etc. One of the unexpected benefits of the process has been a focusing of attention on means of improving dimensional accuracy of standard green sand castings.

Basic Cupola Melting and Carbide Injection—Basic cupola melting in which the cupola is lined with magnesite brick plus a monolithic surface layer consisting mainly of dolomite (instead of the current acid lining of silica brick plus ganister), has proved very advantageous in a number of cases. It is estimated that only about 55 cupolas in use now employ this basic melting but it is anticipated that the number will increase rapidly. As with all new processes it possesses both advantages and disadvantages.

As concerns advantages, basic melting permits the foundryman to be comparatively independent of requirements for pig iron and specially selected steel scrap. Also, because of the cleansing action of the basic slag, he can effectively employ inferior grades of coke. Higher temperatures and freedom from bridging are other beneficial results. Basic cupola operators claim to obtain a cleaner metal and to experience less attack on the lining than with acid melting. For example, one user reports that scrap has been reduced 40 per cent after changing from acid to basic melting. He is also able to operate two days instead of one day before dropping the bottom of his cupola for lining repair.

The above remarks concern the use of a comparatively mildly basic slag. The basicity level is held to around 2.0 and is effective in reducing sulphur in the metal to 0.05-.08 per cent despite the addition of comparatively high sulphur scrap to the cupola.

Experience May Minimize Disadvantages

There are disadvantages to the process which it is hoped will be minimized with more experience. For example, despite decreased erosion of the basic lining, basic refractories are currently more expensive than acid refractories, the basic slag is quite corrosive to the front slagger or slag hole and special refractories are required, the carbon control of the iron is more difficult, etc. In addition, unless a hot blast or special additions are employed, there is a tendency to lose about twice as much silicon as in the acid process. Despite these disadvantages, there would appear to be no question that the benefits of using a mildly basic slag in a basic cupola are so great that this process will influence future gray iron practice. As indicated, outside of operational advantages, it is of particular interest as an additional means of assuring maximum quality in gray iron castings.

Slags of higher basicity than described above are a special case in basic melting and are used to reduce the sulphur level to 0.03 per cent or below, primarily to permit the ready production of nodular or ductile gray iron. Such high basicity operation introduces special problems as concerns slag fluidity, but the process has found a useful place in the operation of foundries specializing in nodular gray iron production.

When means of producing very low sulphur levels in gray iron are being considered, the recent development of methods of injecting solid calcium carbide in a gas stream into molten gray iron cannot be overlooked. It has been found to be relatively easy to reduce the sulphur level by such injection to 0.015 per cent or under, and the resultant gray irons show unusual strength and chill-resistant properties. The injection method is still very new and in an early development stage but it is again felt that it will definitely influence the future production of gray iron castings.

Nodular or Ductile Iron—Nodular or ductile iron combining some of the advantageous castability characteristics of gray iron and some of the physical and ductility characteristics of malleable and cast steel, has been widely publicized. As might be suspected in a new revolutionary development of this character, certain problems have been encountered and these, at least temporarily, dampened the earlier enthusiasm for this remarkable material. Despite these factors production of nodular iron last year was between 50,000 and 100,000 melt tons, and there is a definite feeling of optimism as concerns its place and increasing importance in the engineering field.

This belief is based on the fact that means have been found to: (1) combat deleterious elements that prevent development of the desired spheroidal graphite structure, (2) decrease pinhole formation and cope slag, (3) obtain the desired structure with smaller amounts of magnesium-bearing nodulizing alloys, and (4) produce the desired structure through solid injection of calcium carbide, magnesium oxide and rare earth oxides.

Although it is believed that nodular gray iron will never replace standard flake graphite gray iron because of casting limitations and specific desirable properties obtainable only in a standard gray iron casting, there appears to be no question that nodular iron is what is sometimes termed a "gap" metal; that is, it will find a place in the high strength casting field where some ductility is required and where it can be more economically used than either malleable iron or cast steel. Since it can be produced in a gray iron foundry and is potentially a tonnage product, it is certain to influence the operations of gray iron foundries in the future.

Conclusion—Clearly there is reason for great optimism as concerns the gray iron industry as a whole. It is evident, however, that the industry, in common with all other modern industries, is becoming more and more dependent on scientific research. Means must be found by which individual foundries can effectively utilize new engineering developments in the casting field. Many outstanding foundrymen have unselfishly given of their time and knowledge to try to supply this need, and many organizations, including the Gray Iron Founders' Society, have attempted to meet this need in some part through dissemination of information to members and to users of castings.

However, there still appears to be an increasing need for an expanded central research and development organization representative of the whole gray iron industry and devoted solely to gray iron, possibly utilizing some of the techniques developed by the British Cast Iron Research Association. There is almost an unlimited field as concerns the contribution that gray iron castings can make to American industry.

Largest aluminum permanent mold casting being made today is shown after ejection from the mold. Ready for shipment it weighs 650

Aluminum Castings

Development of new alloys—including metals having improved properties at elevated temperatures—increased plant mechanization, and emphasis on quality control have accompanied broadening use of aluminum castings

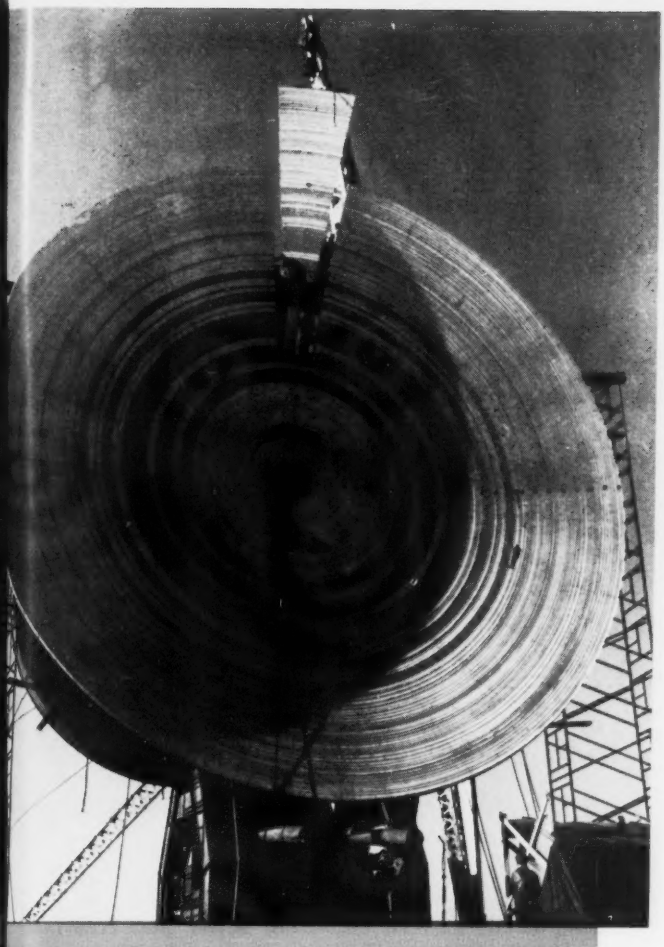
By FLOYD A. LEWIS
Editor
The Aluminum Association

PRODUCING better and cheaper castings and making their plants better places in which to work have been the twin objectives in most of the important advances scored by aluminum foundries the last five years. Other developments have broadened the field of application of aluminum castings.

The increasing mechanization of foundry equipment has brought new economies in aluminum foundries of all types and has greatly reduced the manual labor required of foundry personnel. At the same time the resulting improved plant layout, together with better ventilation and lighting, have materially improved foundry working conditions in the industry.

Two foundries now being built adjacent to aluminum smelting plants will obtain their supply of molten metal directly from the smelters. Thus the pig remelting operation will be eliminated, with resulting economy and simplification of operation. The progress of these units will be watched with great interest.

The relatively stable price of aluminum alloy ingot compared with that of other alloys has enhanced the competitive status of aluminum castings with other metals, particularly in the die casting field. New milestones in maximum size of castings produced



This Navy radio reflector comprises 30 tons of sand-cast aluminum sections 2 in. thick

have been reached in both permanent mold and die castings.

An estimated 438,000,000 pounds of aluminum castings were produced for sale during 1952. Production in captive plants for the producers' own use is estimated at 132,000,000 pounds, making the grand total for the year 570,000,000 pounds. Comparative figures for 1947 were: For sale 324,613,000 pounds; for producers' own use 117,383,000 pounds; grand total 441,996,000 pounds.

Of the 438,000,000 pounds produced for sale in 1952, sand castings accounted for about 40 per cent, permanent mold (and semipermanent mold) 30 per cent and die castings 28 per cent. Other casting processes accounted for less than 2 per cent of the total production. For comparison, of the 324,613,000 pounds produced for sale in 1947, 36.6 per cent comprised sand castings, 35.9 per cent permanent mold (and semipermanent mold), 27 per cent die castings, with less than 0.5 per cent produced by other processes.

Thus whereas all of the various types of castings showed increases in total production, sand castings showed the largest increase, smaller increases being noted for die and permanent mold castings in that order. Although castings produced by other processes still account for only a minor proportion of the total, their production was about 10,000,000 pounds in 1952, a five-fold increase over the 1,831,000 pounds of aluminum castings reported for 1947.

Quality control procedures are under constant scrutiny in an effort to furnish the customer castings of consistently good quality. One of the significant trends noted here is the extension of the use of statistical methods to aid in control of foundry processes.

Another aid to quality control which is being seen in some foundry laboratories is the direct-reading spectrometer. This unit provides accurate complete chemical analyses of alloy specimens in less than three minutes and thus aids in keeping alloy composition within specified limits.

New High-Temperature Alloys—Considerable progress has been recorded the last five years in the field of casting alloys. Outstanding in this development work has been that directed toward alloys with improved properties at elevated temperatures. The need for such alloys has been stimulated by the increasing requirements for jet aircraft engines.

The U. S. Air Force, the Naval Research Laboratory and several industry laboratories have been particularly active in this field. The Air Force work with modifications of the well-known Y or 142 alloy has resulted in a so-called "ML" alloy with definite improvements in strength at temperatures in the 400-600°F range. Work at the Naval Research Laboratory has resulted in a new experimental alloy, "SAM," containing mischmetal as the major alloying constituent. The mischmetal used in compounding this alloy consisted of 50 per cent cerium, 48 per cent other rare earths including lanthanum, balance minor impurities. The SAM alloy is reported to have relatively low tensile properties at room temperature but properties at elevated temperatures higher than those of present commercial alloys.

These alloys, together with others from the laboratories of the aluminum industry now under various stages of evaluation, show definite promise of being able to expand the use of aluminum in the elevated temperature fields. Improvements in tensile strengths of 50 to possibly 100 per cent over those of Y alloys are indicated.

The trend toward the use of aluminum alloys having silicon as a major alloying element, noted during and after World War II, has continued. The excellent casting characteristics of these alloys have made them particularly useful for parts of intricate design or those which must be pressure tight. Alloys containing silicon and copper retain most of the excellent casting characteristics of the aluminum-silicon alloys combined with the higher strength of the aluminum-copper series. Adding magnesium to such alloys provides improved mechanical properties on heat treatment, and the addition of manganese and nickel improves the properties at elevated temperatures. These alloys today provide some of the best combinations of casting characteristics and mechanical properties for general application.

Aluminum-magnesium binary alloys also have in-

Overhead belt and conveyor train handle sand and molds in this highly mechanized aluminum foundry

creased in popularity in recent years. Four of these are now standard foundry alloys containing, respectively, 10 per cent, 4 per cent, 7 per cent and 8 per cent magnesium; they were introduced in that order. All are more difficult to cast than alloys containing silicon as a major alloy ingredient but they provide higher strength and greater resistance to corrosion. Those containing 4 and 7 per cent magnesium are suitable for sand casting and, with certain modifications, for permanent mold casting. The alloy containing 10 per cent magnesium is confined to sand casting and must be heat treated to develop optimum properties. The one containing 8 per cent magnesium is used for die casting.

The past five years have also seen an increase in the use of the aluminum-magnesium-zinc alloys. These alloys require no heat treatment, attaining high strength through aging at room temperature. However, they require a rather exacting foundry process to achieve optimum mechanical properties. Other properties of these alloys that have contributed to their increasing use are dimensional stability, excellent machinability, high luster, good corrosion resistance, and favorable brazing characteristics.

Increasing Mechanization—Aluminum foundries are following the general trend in industry toward increased mechanization. This is helping castings to maintain their competitive position with respect to other methods of fabrication. Both the raw materials and the rough and finished castings are being handled by conveyors or other mechanical handling devices.

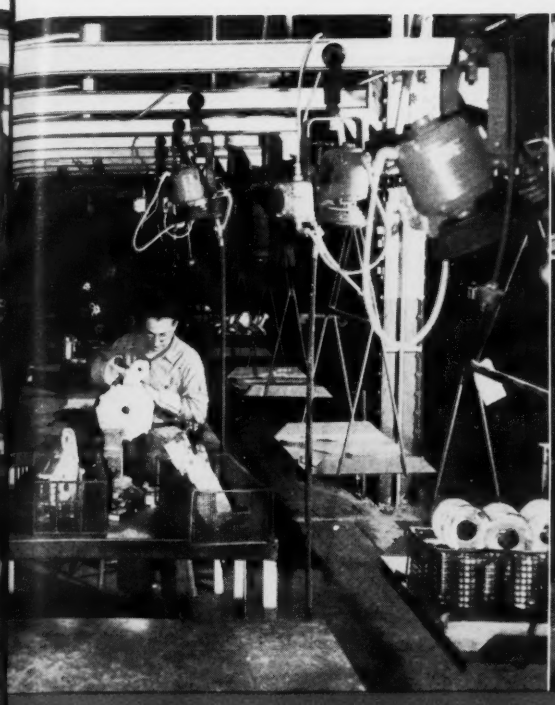
One large modern foundry, for example, has mold conveyor trains in the sand foundry; an overhead monorail system for handling molten metal; overhead and underground bulk conveyors for transporting molding sand; and an elaborate power and free conveyor system for moving cores, castings and scrap. Another foundry uses specially designed lightweight aluminum pallets for handling sand molds between the molding machines, the pouring stations and the shakeout tables.

Sand handling and treating facilities have been improved in many foundries, resulting in better and more uniform molding sands. Conveyorized sand handling systems are being found in an increasing number of foundries.

Molding machines and core blowing machines have increased in capacity and improved designs have been developed. The molding machines have been provided with greater squeeze pressure, obtained through the use of larger pistons in the hydraulic actuating mechanisms. Molding and core blowing machines with automatic or semiautomatic control of many of the operations are now in use. These improved machines reduce the foundries' dependence on individual molders' skill; they also reduce the physical effort required of the molder and increase the production per man-hour.

In furnace equipment, there has been a trend toward more low-frequency electric induction units, especially in die casting plants. Some of the most modern plants employ combination melting and holding furnaces with two reservoirs, one for charging and the other from which molten metal is ladled. The stirring action of the electric current in these units produces agitation within the charge which keeps alloy segregation at a minimum. These furnaces are cooler in operation than the majority of oil or gas fired units, an advantage from the standpoint of employee comfort.

Aluminum flasks and bottom boards are being used



Trays suspended from monorail conveyor carry aluminum castings to and from trimming room

Core sand feeds automatically to blowing machine hoppers at Alcoa's Bridgeport, Conn., foundry

in increasing numbers not only in aluminum foundries but in foundries handling other metals as well. Their light weight makes them easier to handle than similar equipment made of heavier materials, thus reducing worker fatigue. Aluminum pattern equipment also continues to be used in foundries of all types.

Sand Casting Developments—Shell molding is one of the outstanding developments of recent years in sand casting. This process is now in production use in a number of foundries and its potentialities are becoming better defined. Castings made by this process have smoother surfaces and higher dimensional accuracy than ordinary sand castings. There is a possibility that scrap losses may be reduced and, of course, the process requires much less sand than ordinary sand casting methods. The sand, however, is not reusable under ordinary conditions.

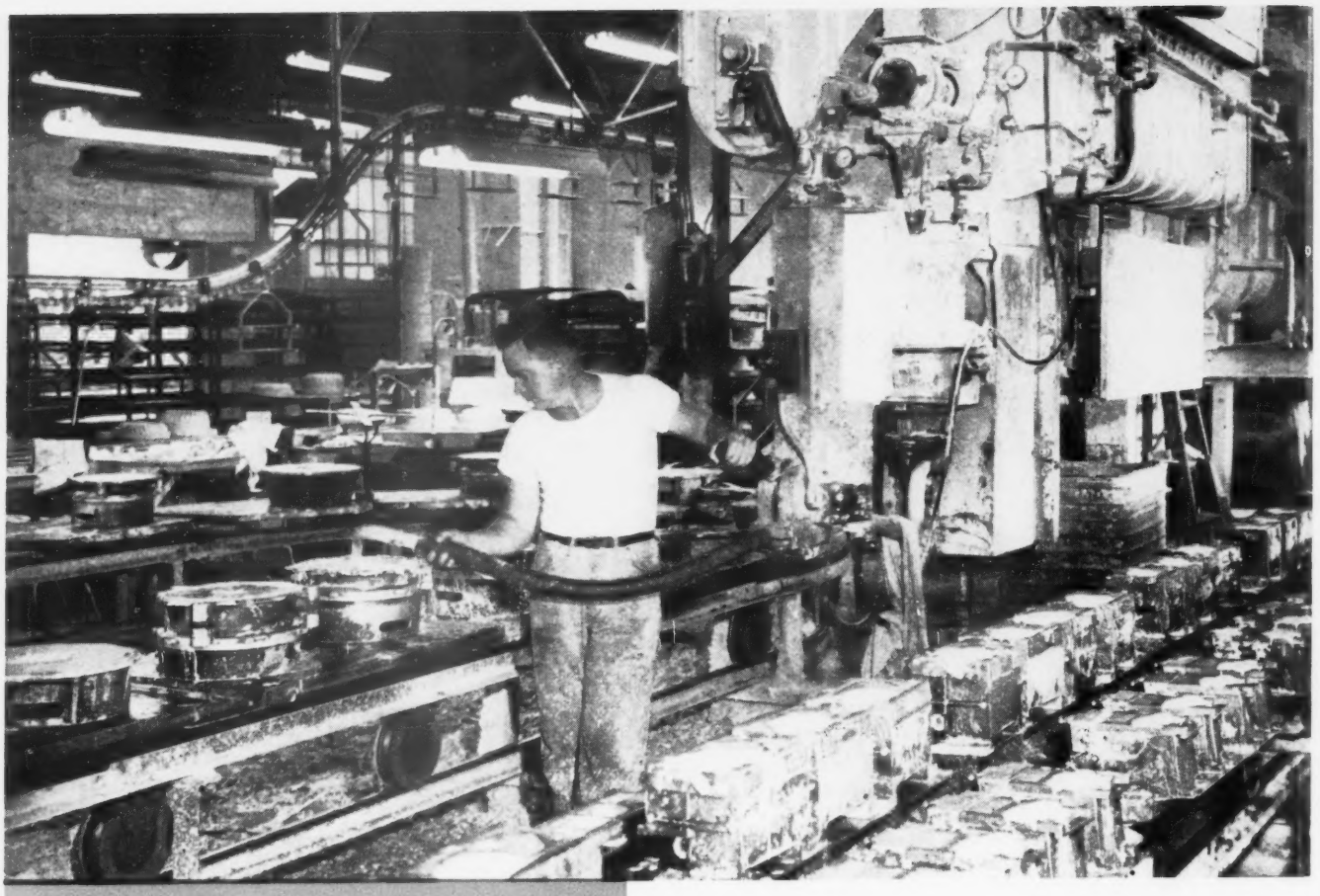
The cost of equipping a production center with machines, ovens and an adequate supply of patterns for the production of resin-bonded molds is relatively high. If the process is to make headway in the aluminum field, it would appear that the conditions required would include either large production runs or a number of lesser production runs which would permit continuity of operation. In addition, it might well require accuracy or smoothness, or both, not now demanded of castings made by other processes.

Among parts now being successfully cast in aluminum by the shell process are sheave type wheels and impellers. An aluminum diffusion plate is being made with the face shell molded and the back molded in green sand. There is some question, however, as to whether the shell molding method will ever occupy a large or important place in the aluminum casting industry because both permanent mold and die castings have smoother surfaces and better dimensional accuracy than present shell-molded parts, and so far both are competitive with shell molding in cost.

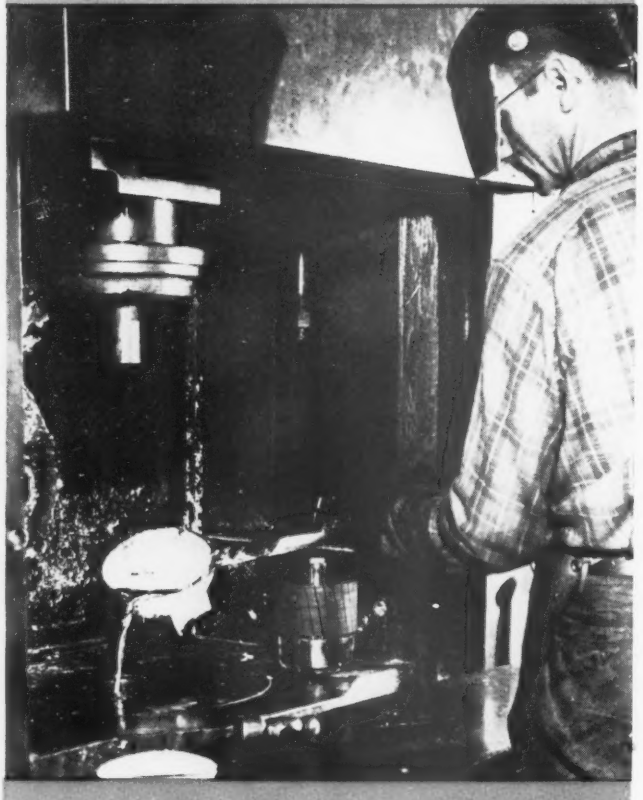
The comprehensive investigation of mold gating being conducted by the research committee of the American Foundrymen's Society at the Battelle Memorial Institute is expected to yield important results. These tests have been made with transparent plastic molds into which water is poured. Motion pictures are taken of the behavior of the water as it flows through different gating systems which later can be studied. The new information being obtained in this investigation is expected to lead to better castings, reduce scrap, and lower the amount of metal poured per casting.

Expansion in the use of dielectric heating for curing sand cores is another development noted during recent years. Faster curing of resin-bonded cores can be obtained by this means than in conventional ovens and often results in lower overall cost, especially where long production runs are involved.

Permanent Molding—One of the most significant advances of recent years in the entire aluminum casting field is the extension of the permanent mold method to castings of a size several times larger than had previously been considered feasible. Inherently a mass-production method suitable in most cases only for large production runs, the permanent mold method often is not economical for quantities of less than several thousand units. With large castings of certain types, however, it has been found that the expense of constructing the mold is justified for runs of only a few hundred units or even less, especially where large savings in foundry space and in



Making plaster molds for aluminum castings. Smooth surfaces and close dimensional accuracy are provided by this molding process

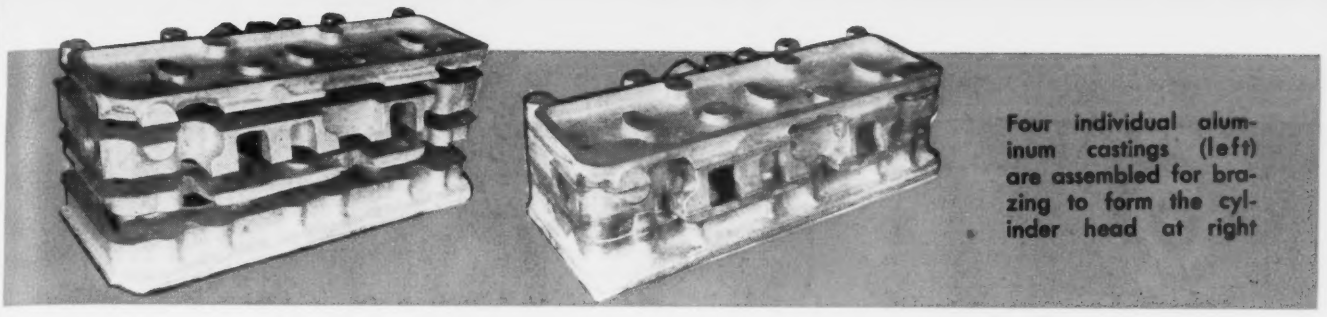


Operator pouring molten aluminum into the die of a rotor die casting machine

man-power can be realized. At the same time, the appearance and physical properties of the finished castings are improved considerably compared with similar sand castings. A 650-lb casting which thus proved economical for the permanent mold method is shown in an accompanying illustration.

Another outstanding development, which applies mostly to permanent mold castings, is the production of complicated parts as separately cast sections which are then brazed together to form the complete part. Automotive cylinder heads and cylinder block castings which contain intricate internal passages for cooling water are among the units produced experimentally by this method. The relatively simple component parts of the composite units can readily be cast in permanent molds whereas to cast the units in one piece in a permanent mold requires the use of sand cores (semipermanent-mold process). Casting them in sections thus eliminates the costly operations of making, assembling and removing sand cores.

Extension of semiautomatic operation of casting machines is one of the trends noted in the permanent mold field. Once the operator has closed the mold and actuated the pouring mechanism, all other operations in the cycle are automatic. In one type of set-up used for producing aluminum engine castings the mold is mounted atop a crucible-type holding furnace. After the mold is closed, the entire unit is tilted, which admits molten metal into the mold. The unit is held in this position long enough for the metal to solidify, after which it is returned to an upright position. The mold is then opened and the casting withdrawn. Any stray metal chips remaining in the mold are then blown out by means of an



Four individual aluminum castings (left) are assembled for brazing to form the cylinder head at right

air hose after which the operator recloses the mold and the cycle is repeated.

Die Casting Advances—Because aluminum alloys now cost less than other die casting alloys, an increasing proportion of die casting production is being done in these alloys. Aluminum die castings now represent about 50 per cent of the total dollar value of all die castings being produced in the United States.

High-pressure, cold-chamber die-casting machines are continuing to displace the older air-injection gooseneck machines for aluminum alloys, although the gooseneck machines are still used for some types of castings. Cold chamber machines of increasing size and pressure have been developed in recent years which has extended the size limitations of the die casting process.

Aluminum die castings weighing from a fraction of an ounce up to about 20 lb can now be produced economically. Parts measuring up to 36 x 12 x 9 in. in over-all dimensions are now being die cast successfully in aluminum alloys, and parts having maximum lengths up to 84 in. have been so produced.

Limitations on complexity of parts that can be successfully die cast have been extended so that today the die casting process more and more is being regarded as an assembly method. For example, the sound head of a motion picture projector which formerly was produced as a 33-piece welded assembly is now being made as an aluminum die casting at a saving in cost of more than 25 per cent. In cases such as these the die casting process is economical for considerably shorter production runs than the average die casting; in some cases runs as short as several hundred units have been found economical.

As the size of cold chamber machines has increased, metal injection pressures also have been raised. Today pressures of more than 20,000 psi are in common use and in some cases pressures as high as 30,000 psi are being employed.

The trend toward automatic or semiautomatic operation of casting machines is even stronger here than in the permanent mold field. In most cases all the operator needs to do is to close the die and ladle the required amount of metal into the chamber, after which he actuates the plunger of the metal injection mechanism. All succeeding operations are controlled automatically. In some cases, even the molten metal is introduced into the chamber automatically. This is being done successfully by two methods, through a mechanical ladling arrangement and by means of a newly developed magnetic pump.

Closely related to the die casting process is the pressure casting of the conductor assembly in the rotors of squirrel-cage electric induction motors. This process has been extended successfully to larger motors during the last five years and is now being used regularly for motors ranging up to 40 horsepower.

Developments in Other Processes — Advances in plaster molding are primary responsible for the large increase in production of aluminum castings by processes other than the three principal ones. This process is being used successfully in the manufacture of pump and turbine parts for automotive transmissions of the torque-converter type. These parts are rather complicated assemblies which must have extremely smooth surfaces and high dimensional accuracy for efficient operation. By producing them in plaster molds the necessary smoothness and accuracy are obtained without expensive and difficult machining. Recent refinements have simplified the process and adapted it to the mass production of torque-converter parts.

Electronic wave guides for ultrahigh frequencies are other parts requiring extremely smooth surfaces and high dimensional accuracy and these too are being successfully made as plaster mold castings.

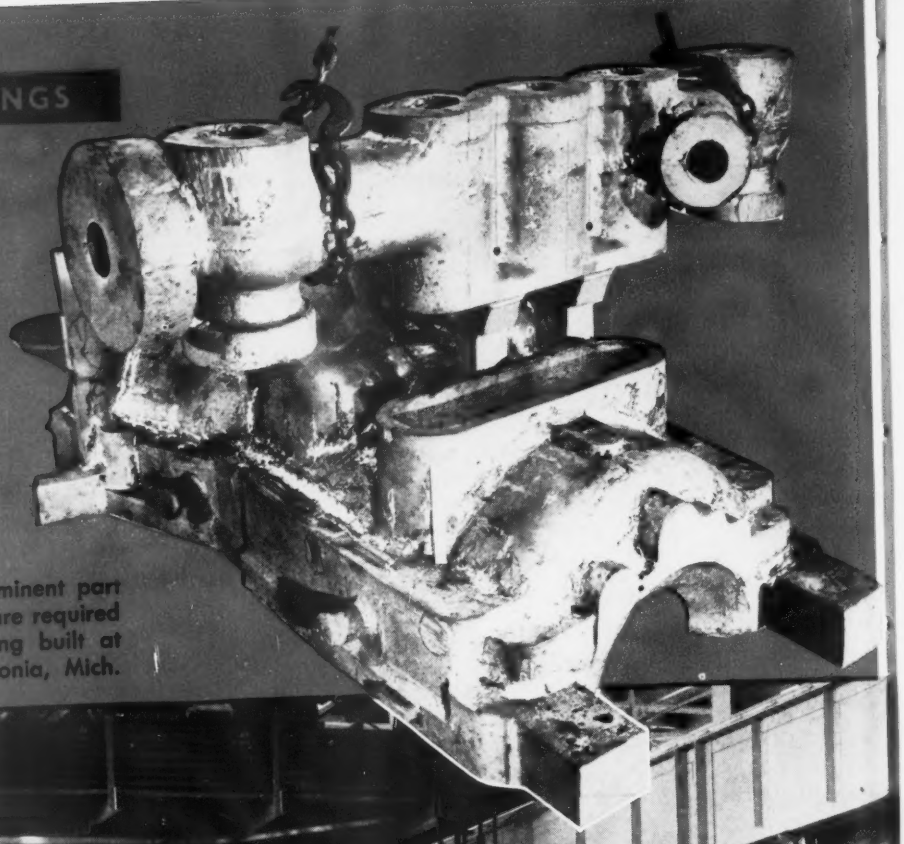
Investment and centrifugal casting methods continue to have limited but important applications in the aluminum casting field.

Future Prospects—An increasing use of aluminum in all the major fields of application and the development of many new uses awaits only the expanded supply of metal which will soon be available. The industry's present expansion program provides for a maximum annual output of almost 3,500,000,000 lb of primary metal by 1955, or almost 2½ times the output in 1950. An increasing use of aluminum castings undoubtedly will parallel the increased use of this lightweight metal in other forms.

One of the most important factors in the continuing expansion of the use of aluminum is the more favorable long-range raw material situation as compared with other metals. Large deposits of high grade aluminum ore are still available while the known reserves of high grade ores of other common metals are rapidly becoming depleted.

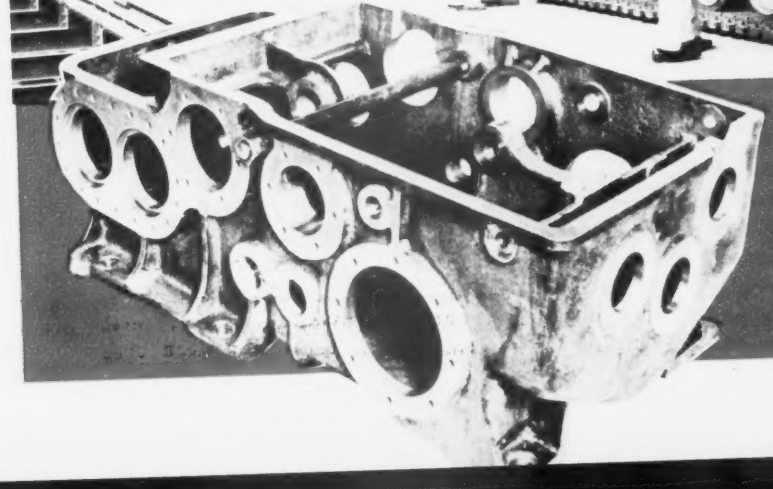
Another significant factor is the stable price of aluminum compared with the highly fluctuating prices of other metals in recent years. Aluminum is the only basic engineering material now available at a price anywhere near its 1939 level. As a result, aluminum will be used for many applications in the future where it was not considered economically feasible in the past. Aluminum castings naturally share this economic advantage along with other forms of "the modern metal for modern uses."

PROGRESS IN CASTINGS



Formerly a one-piece steel casting, this 14-ton steam turbine unit was redesigned to be made of two castings. Here the valve chest is being lowered into place prior to assembly by welding

(Below)—Steel castings play a prominent part in defense work. Large tonnages are required for tanks such as these units being built at the Ford Motor Co.'s plant in Livonia, Mich.



(Left)—This cast steel steam locomotive booster formerly was a weldment. The redesign reduced its weight 15 per cent to 1850 pounds, cut total cost 18 per cent

Steel Castings

Technical progress among steel foundries has been extensive and varied. While work on improving casting design has been particularly outstanding, numerous developments in production practices have bettered casting quality. These apply to sand control and reclamation, metal flow and heat transfer, gating and risering, melting practices, heat treatment, and cleaning room operations

By CHARLES W. BRIGGS
Technical and Research Director
Steel Founders' Society of America

TECHNICAL developments in the production of steel castings since the close of World War II have been many and varied. A full discussion of the details of these developments and what they have meant to the steel casting industry would be too extensive and perhaps too detailed here, particularly for those readers who are not closely associated with the steel casting industry.

It is believed, however, that the progress accomplished by one industry can be of interest to those of a similar industry, so it is planned to review briefly those developments which have created considerable interest to steel foundrymen during the last seven years, and to briefly point out what the future may have in store.

Casting Design—A consideration of casting design should be foremost in one's thoughts because little can be done with poor and impossible casting designs no matter what the technical developments may be.

Steel castings, weldments and forgings became so competitive following the war that a different approach was made to steel castings that were costly to produce. The methods adopted were not new; they just had not received the commercial recognition they deserved. Reference is made to casting redesign through the use of cast-weld construction and composite fabrication. Steel casting designs were broken up into separate parts, cast, and then welded together to form complete structures. Important savings were made because a large percentage of the cores could be eliminated. Many chills were no longer needed, risers were easily placed, and defectives, caused by complicated sections and high stress active systems, were eliminated.

Also, castings were incorporated in weldment designs because of repeat parts or the high cost of welding to form complicated parts. Composite fabrication has been carried on strictly on the basis of costs, and castings are used when they provide lower cost. Engineers using such construction have learned that steel castings and wrought steel parts are interchangeable as to properties and serviceability.

Greater emphasis on casting design, by the steel casting industry also resulted in improved cast steel parts through redesign. Casting simplification must, of course, be carried on with complete cooperation of the casting purchaser, but it has paid big dividends to those foundries engaging in this activity. The industry as a whole is today showing the designing engineer what can be done by deeds and action through the application of casting design principles, and not merely complaining about the intolerable situation, as was the custom not so many years ago.

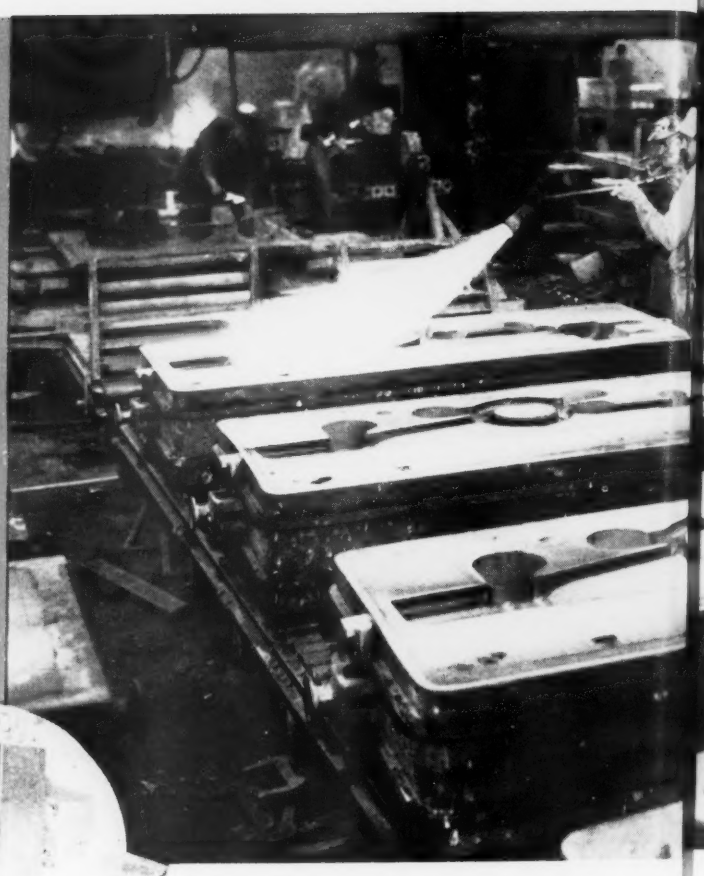
Even more will be done in the field of casting design by steel foundries in the immediate future. Foundries are now equipping stress analysis laboratories so that they can assist their customers with correct design information. Both foundry management and the customer will surely learn in the days to come that the best design to withstand service stress conditions is the best casting design as well.

Molding Operations—The industry is moving toward the use of finer sands, and while it is difficult to detail this development over seven years, nevertheless a definite trend exists. Along with the use of finer sands has come the greater use of green sands. Techniques are devised to use green sands rather than build molds, in whole or in part, from cores. This trend is important especially for large castings.

More consideration is being given to sand control than ever before. The careful weighing and metering of batch materials in sand preparation is necessary if facing sands are to be uniform. Developments such as electronic weighing of batches, and use of meters gaging the water addition based on the moisture content of the batch and the humidity of the atmosphere, have been most helpful in the establishment of uniform mold conditions day after day.

The reproducibility of molding sands and core sands has been tackled from another viewpoint, namely, systematic study of core oils and binders. Several studies have been carried on to set down the varia-

Gear case cover is fabricated by welding together steel castings and rolled pieces shown below



tions that may be expected in these batch-made materials. Acceptability tests have been prepared and comparative tests have been made on almost all binders and many core oils used by the industry.

The fundamental properties of sand have been vigorously studied. Through studies on the effect of molten steel on sands have come developments in sand reclamation, in types and effectiveness of mold and core washes, and in greater mold stability.

The resin-bonded sands have been used extensively in cores for several years because of the interchange of information on their use through the Technical and Operating Groups of the Steel Founders' Society.

Molding Equipment—The operating men of the industry have been required to increase the output of steel castings during the last few years and they have done this by following latest developments in molding machines and core blowers. Semiautomatic molding machines are now being used in steel foundries. Also, since the end of World War II, the number of coreblowing operations has increased tremendously. Now miscellaneous wooden coreboxes are being blown with little modification for venting and blowing orifice. Sands are being blown today that are fairly stiff compared with those blown seven years ago. Setup time for core blowing has dropped considerably, and operators are moving from one blower to another while staff men set up for new jobs.

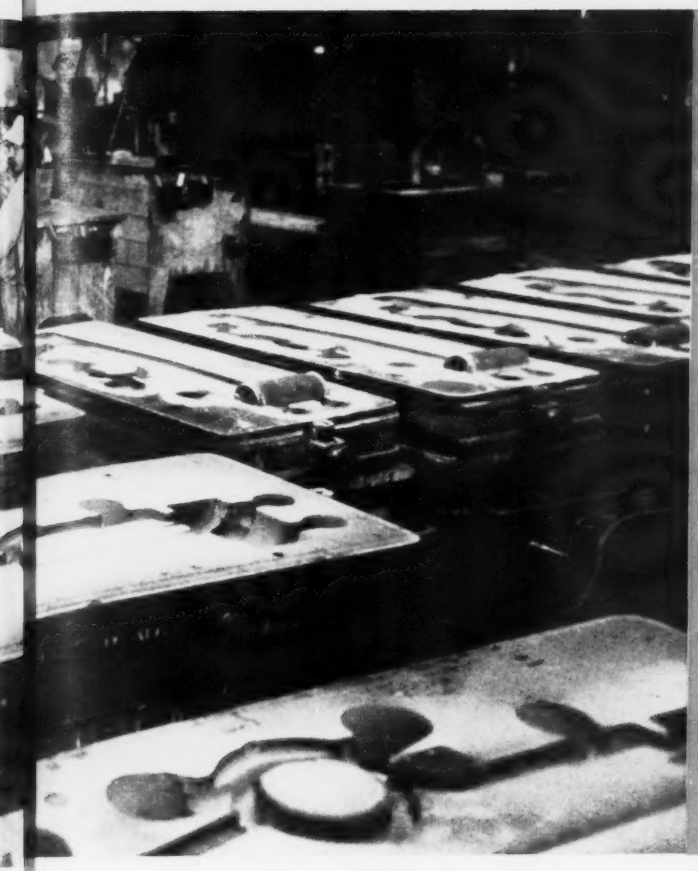
The dielectric baking of cores has been adopted by a few foundries and others will undoubtedly find that the method has application. Also, infrared drying has been developed and adapted to use for the skin drying of molds.

A number of interesting developments have been made in the reclamation of steel foundry sands. A low-cost system for water scrubbing of sands has been developed and a dry reclamation system, based on air scrubbing and classification, is showing very promising results. A number of steel foundries have adopted these methods, not only to lower sand costs but to improve casting surface conditions. Extensive research has been done and is continuing on sand reclamation.

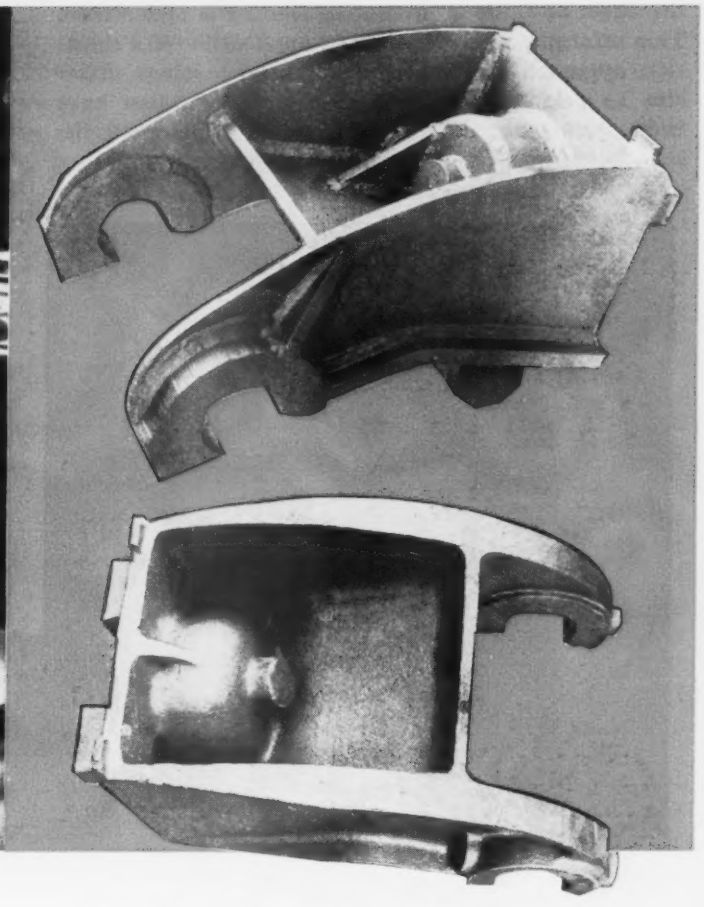
Interest has been exhibited of late in extending the industry's knowledge of moldable chills and insulators. Many granular materials have heat-conducting properties different from those of silica sand. These can be inserted in the mold at strategic points as a facing material or core inserts to promote increased cooling, or to retard solidification.

Mold and core washes have been given considerable study of late as to acceptable types and the degree to which they improve the surface smoothness of steel castings. Studies have been carried on to develop washes that become glazes when in contact with molten steel in an endeavor to improve the surface appearance of steel castings.

Materials Handling—A large part of the steel casting operations consists in problems of materials handling. Many steel foundries have taken this problem



Skin drying molds in a steel foundry. The steel casting industry is tending toward greater use of green sand and finer sands



Top view shows an all-welded rocker arm weighing 147 pounds. Conversion to a steel casting reduced cost 12 per cent and weight 5 per cent

very seriously and have conducted detailed analyses of their handling operations. Lift trucks vs conveyors, and monorail systems vs load luggers, have been carefully investigated and foundries have been rearranged to reduce the number of times that molds, cores, castings, or supplies require handling. Many foundries have established a system of palletizing all, or nearly all, supplies. In many cases castings are shipped on pallets.

The Turbo-drive method of moving sands around the shop, to the mullers and from the mullers to molding stations or coremaking areas, is an indication of the development in materials handling.

Shell molding is being carefully investigated by steel foundrymen. It is observed that there are several difficulties in the production of carbon and low-alloy steel castings in shell molds, but much thought and study is being given to the problems in an endeavor to overcome them. Production runs have been made with steel of a 0.45 per cent carbon content so it will be possible in the near future to produce the 0.20 to 0.40 per cent carbon steels in shell molds.

High-alloy steels and austenitic manganese steel are being produced in shell molds on a very successful basis by several foundries.

It is believed that in the near future further extensive use will be made of resins as binders of molds and cores. Shell molding is a step along the path of molding progress. A great deal will be learned regarding the close packing of sands, complete coating of grains with films of bonds, the use of molding by extrusion methods, the employment of grained materials other than sand, as well as the blowing of all types of sands, from the stiff, poor flowing sands to the resin-bonded sand.

Metal Flow and Heat Transfer—Considerable research has been conducted the last few years on the flow of steel as it enters the mold from the gates and its action in the mold. Color motion picture studies have been made available to the extent of several hours of film running time depicting the mechanics of the flow of molten steel. These studies have been most helpful in the design and construction of gates. Gates are responsible, not only for bringing foreign material into the mold, but they are also responsible for mold erosion. These undesirable conditions can be materially reduced and, in certain cases, completely eliminated through the use of facts learned from the research.

Studies in heat transfer from the molten steel to the mold have resulted in the development of improved feeding systems. Temperature measurements during the solidification of steel have aided in the calculation of solidification times, and have permitted the calculation of riser dimensions on a practical basis for the risering of production castings. Such information has increased riser efficiency until today it is the general rule to employ risers that contain less than 30 to 50 per cent of the metal employed a few years ago.

The distance that many risers feed is known, and

the effect of chills in promoting feeding is understood. This information has permitted application of a scientific approach to the feeding of steel castings. Riser size as related to section size and area also have been spelled out so that it is possible to detail the construction of risers and place them on pattern equipment.

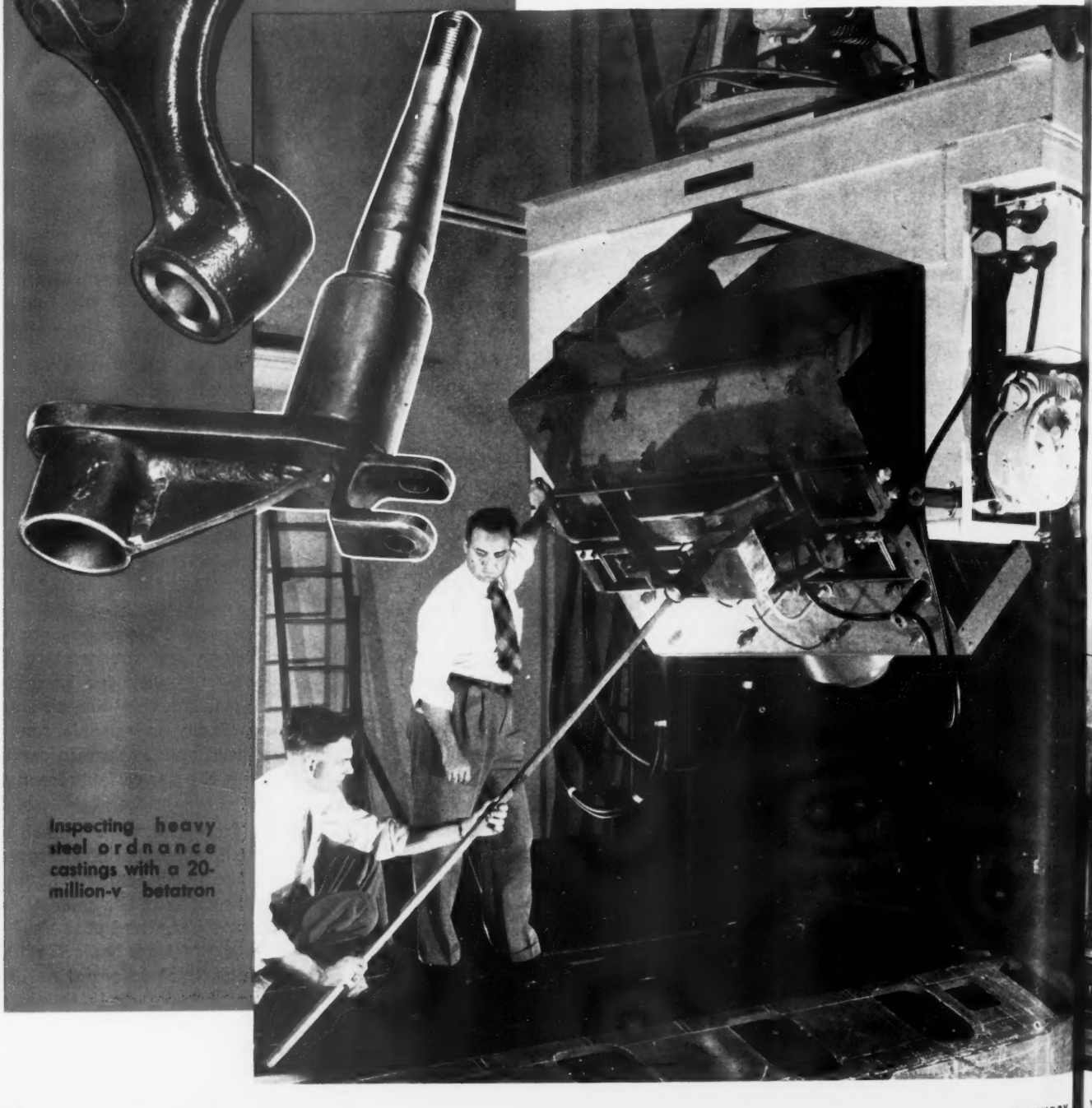
Feeding distances, temperature gradients, effectiveness of padding, and the employment of chills have all become more thoroughly understood, and men are now being assigned jobs in steel foundries to lay out the feeding and gating requirements for new casting applications.

Extensive studies were carried on regarding the use of necked-down risers so that they could function fully and at the same time be removed quickly and easily. Large savings in cleaning costs have been realized because of saving in time and materials through the reduction of gas cutting of risers.

Risers have also been made more efficient by studies of riser compounds and the quantity required for their efficient operation. Exothermic compounds have been developed which permit late feed demands to

This one-piece steel casting, a trailer axle, replaced a welded part (bottom) with improvement in strength and appearance, at a saving in cost of 28 per cent

Allis-Chalmers Mfg. Co.



Inspecting heavy steel ordnance castings with a 20-million-v betatron

be satisfied by very short, small risers. This development has saved many castings that otherwise would have been poured short for one reason or another. The fact that yields upward of 90 per cent can be obtained has made this development an interesting one to all steel foundrymen, especially to those producing large castings.

Metal Developments—The use of oxygen in the melting of steel, both in electric and open-hearth furnaces, was quickly developed in the steel casting industry shortly after it was introduced to the steel mills. Time savings resulting from the reduction of heat times, because of oxygen introduction into the melt, were an important factor to many foundries in boosting their production during the first part of the Korean conflict when steel castings were needed in large quantities. At that time melting procedures were carefully studied and new practices were promoted.

The systematic study of the effect and importance of hydrogen and nitrogen in cast steel did much to change melting procedures. It was observed that hydrogen and nitrogen could be eliminated efficiently if a vigorous boil were maintained. The carbon drop in per cent per minute for a time interval was correlated with the gas contents. These studies have improved the properties of the metal and lowered the presence of certain defects resulting from high gas content in steel.

Temperature control and fluidity control have been made a part of the melting practice to assist in securing the correct tapping temperature. Thermocouples are being used in both electric and open-hearth furnaces for the production of cast steels in ever increasing numbers. The gaging of tapping temperatures by fluidity and temperature control assists in the production of improved castings because casting conditions can be duplicated and allowances can be made for mold characteristics.

The procedure for the production of boron-treated cast steels for the various processes has been worked out through laboratory and production heat research. There is a good possibility that considerable quantities of alloys may be saved through the use of boron-treated cast steels.

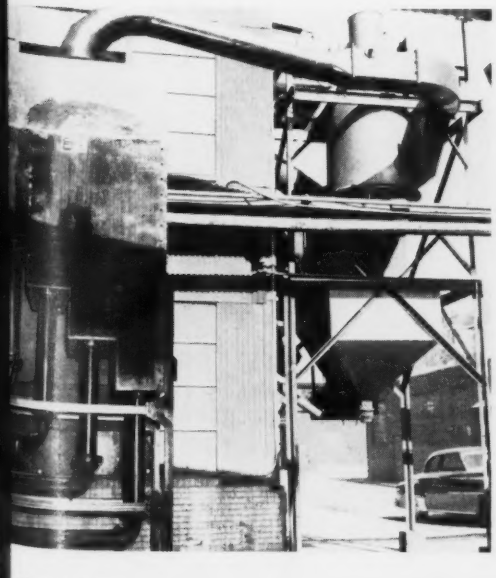
The water quenching heat treatment of steel castings progressed rapidly during World War II, and developments continued in the intervening years. Furnace and quenching equipment were improved, and water circulation speeds and volumes were increased considerably. Larger castings of greater cross sections are now being quenched in large numbers. Studies of homogenization temperatures have been made, with the result that heat treating temperature and times have been reduced. The microstructures of various cast steels have been studied under all types of heat treatments so that microstructures and grain sizes may be familiar to all engineers; these properties differ somewhat from the familiar structures of wrought steels.

The cleaning of castings is an important part of steel foundry practice and a costly one. In the last few years study has been directed to this important activity. The importance of powder washing, flame washing, and scarfing has been demonstrated as a substitute for chipping. Also, use of the torch for effective removal of defects has been improved, and there are universally approved methods applicable to the steel foundry.

Further developments in deoxidation and the improvement of ductility and toughness properties of cast steel are expected in the next few years. Heat treatment times will undoubtedly be considerably reduced while at the same time maintaining excellent properties, especially those of toughness. Greater use of quenched and tempered cast steels will develop because the engineer will see the need for better hardenability properties in general engineering applications.

These improvements will be made through research and the interchange of technical information, both of which are being carried on in a stimulating and enthusiastic manner by the foundry managements through their organization, the Steel Founders' Society of America.

Dry sand scrubbing unit. Interest is growing in both wet and dry sand reclamation systems



Considerable attention has been given scarfing, powder and flame washing in cleaning of castings

Brass and Bronze Castings

Improvements in alloys and molding materials, foundry equipment, melting and molding methods—all have contributed to the more efficient production of higher quality castings in copper-base alloys. Recent developments point to still greater future progress

PRIOR to 1945, conventional nonferrous foundries in the United States and abroad were affected by a form of lethargy. It was not until after World War II that the copper-base alloy casting industry was aroused to its peril by data showing the inroads that forgings, fabrications and plastics were making as substitutions and alternates.

It is indeed fortunate that many developments have occurred since 1945 to help nonferrous foundrymen assume once again their rightful position in our industrial economy. One of these developments was the creation of a new freedom of technical expression that has permitted knowledge regarding design of copper-alloy castings to become more available through technical periodicals and societies. This knowledge has permitted material parts having higher physicals, less weight, and lower finished unit costs to become readily available.

The conventional foundry itself has been offered improved equipment and layout, within its ability to pay, that will increase its profits through higher production, better quality, lower costs, space conservation, utilization of less skilled manpower, and more desirable working and community conditions. This has meant, in most cases, application of methods of advanced foundry controls that have later created changes in melting and molding equipment.

Foundry equipment manufacturers have made available efficient and flexible coreblowing and molding machines, utilizing complete dimensionally accurate matchplate pattern equipment, for quality and quantity production. They also have made available special melting units that have contributed to improvement in casting quality, production and cost.

Technically, the foundry has been offered scientific methods of gating and feeding. It has available, more extensively, new synthetic molding sand mixtures and washes, for improvement of cast metal surfaces; insulating pads and riser sleeves made from gypsum, for improving yield and shrink characteristics; knockoff risers, utilizing necked-down risers, metal screens, graphite disks and gypsum riser neck reducers, for improving cutoff and cleanup operations.

Metallurgically, new copper-base alloys and new uses of the old have been demonstrated in beryllium-nickel bronzes and many other precipitation-hardening alloys. Nitrogen and helium degassing techniques for purging alloys have received a great deal of attention in the elimination of intergranular-interdendritic gas porosity, oxides, sulphides, and inclusions. Vacuum melting and pouring for assurance of superior physical properties have been made practical.

Engineering research has indicated definitely the range of pouring and melting techniques necessary for obtaining copper-base alloys of acceptable quality. This has necessitated the use throughout the melting and pouring operation of pyrometric time controls and of the newer deoxidizers, such as calcium boride and lithium, which have the fortunate faculty of having no harmful after effects on copper-base alloys.

Favor Use of Composition Ingots

It also may be noted that the normal foundry, unless it is a shop specializing in high-conductivity copper and precipitation-hardening alloys, now uses 90 per cent to 100 per cent of composition ingot. This fact means that the brass and bronze ingot refiners have assumed the responsibility of presenting the foundry with guaranteed analysis and certification of specifications. It also means that we are now more aware of and familiar with causes of defects caused by ingot containing such impurities as iron, sulphur, silicon, antimony, manganese, cadmium, etc. The latest foundry requirements make it obligatory to set up methods of physically and chemically inspecting the ingot that is received, under properly established quality controlled procedures.

Statistical quality control, with which many nonferrous foundries now have been fully indoctrinated, provides a tool for controlling incoming raw material and outgoing castings at a predetermined quality level. Thus, although it is the consumer who establishes certain requirements for the quality of delivered castings, the foundryman is now able to arrange his manufacturing processes and to provide an inspection routine to insure the quality demanded. Quality control recognizes that the consumer runs some risk of receiving lots of unsatisfactory quality.

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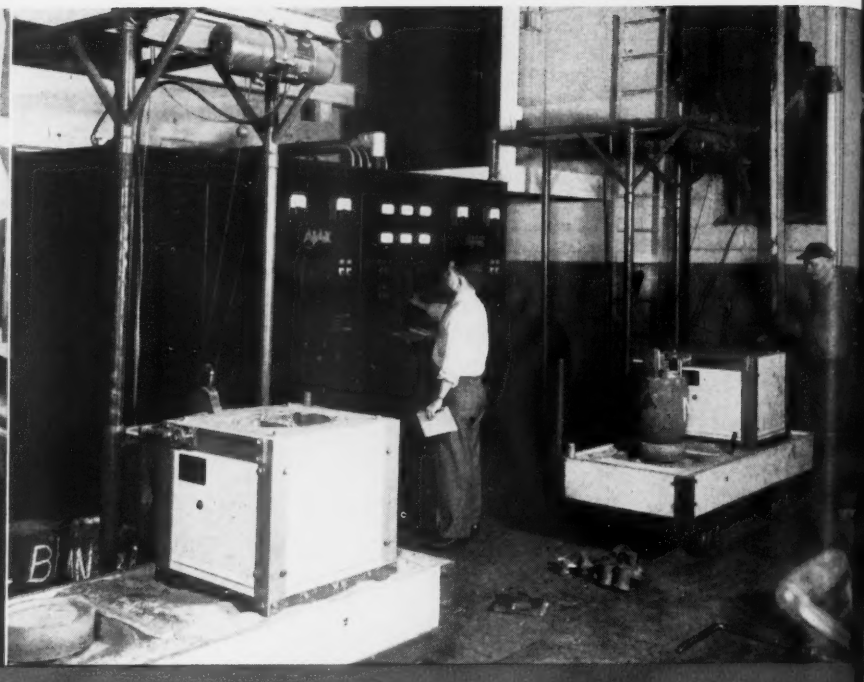
(Above)—Centrifugal casting of brass and bronze has gained impetus in recent years. This shows the pouring basin of a large machine being filled

(Below)—Dumping poured molds onto shakeout conveyor. Better equipment and improved plant layout have helped raise quality of brass and bronze castings

Schaible Co.

Shell molding has potentialities for the nonferrous foundry. Here mold halves are being closed



Induction furnaces in a nonferrous foundry. Melting units generally have increased in efficiency

if the quality of each lot is judged by the results of inspecting only one sample casting. The method of attack presumes the adoption of a risk whose magnitude is agreeable to the consumer and the selection of a particular inspection procedure involving a minimum of inspection expense for the foundryman while guaranteeing the maintenance of the quality agreed upon.

Since 1945, the conventional copper-base alloy sand foundry has been offered other versatile casting methods. Permanent and semipermanent molds made of graphite or refractory-ceramics have replaced in some instances low-alloy iron or alloy steel types. Die castings considerably larger than those cast prior to 1945 are now available. In this field, silicone mold coatings have greatly facilitated cleaning of castings and improvement of the casting surface for plating.

Castings weighing 30 tons are now being made by the use of new type equipment and newer core oils and resins for making baked sand molds of high strength, hardness, permeability and collapsibility. Here too, graphite has been accepted as an excellent mold material. Metal plaster casting has become acceptable, also, since special gypsum casting plasters have been developed with high-temperature resistance and permeability. These castings require little machining, reproduce surface details excellently and maintain dimensional accuracy. Today, plaster cast manganese-bronze castings weighing 50 lb are readily available.

Concrete molds and cores for castings of all sizes are now accepted procedure, with advantages in surface smoothness, accuracy, mold patching elimination and reusability of material. Centrifugal casting also has gained impetus.

Shell molding has offered great potentialities to the nonferrous foundryman. This process makes use of phenolic resins developed in the chemical industry to supplement core oils and increase the output of sand cores in the foundry. Further adaptation leads to the use of phenolic resin as a sand-mold binder, requiring polymerization temperatures in excess of 300° F. The method itself is simple: Thin shells of phenolic resin-bonded sand are formed on a 300° F-plus temperature-resistant metal pattern, the unit is then baked at an interpolated time-temperature constant, the shell is removed and mated, and metal is cast in the completed shell mold.

Shell molding is an excellent tool for providing the consumer with a casting that has better surface appearance and dimensional accuracy and requires less machining. To the foundry, it means better control, lower rejects, manpower and space conservation, adaptation to mechanization and better delivery.

The nonferrous foundryman has been provided a method for salvaging many of his castings by the modern welding engineer. This method, known as the heliarc process, utilizes the electric welding technique which employs a tungsten electrode and a filler rod similar to the parent metal. Another new method of salvage for internal porosity in castings utilizes phenolic resins or metallic oxides under vacuum-pressure-baking cycles.

Great strides have been made since 1945 in establishing the control of health hazards in the foundry. Examination of all potential employees and periodical examinations thereafter, hospitalization and sick benefits, dust-fume-smoke control, industrial safety courses, proper lighting and ventilation, protective guards for men and equipment, washing facilities, and separation of different operations have expressly created and maintained good public relations between employee, employer, customer, and that area of social conscience, the public.

The nonferrous foundry has received even more assistance than in the past in management relations.

Charging a furnace from a lift truck's elevated position is example of modern handling methods

particularly from organizations such as the Non-Ferrous Founders' Society. This includes aid in setting up accounting procedures and cost systems which permit foundries to establish sound selling practices and prices, to achieve a reasonable profit and to avoid competition based upon lack of knowledge of true production costs. Other assistance includes time and motion studies and incentive and wage surveys.

The Future? — It presents rich rewards for the autonomous nonferrous foundryman who seeks self expression and does not permit standard foundry orthodoxy to become entrenched in his mind. As a true individualist, he will have no problem surpassing, in profit and quality, any contemporaries whose conventional foundries still use 10 to 30-year-old obsolete capital equipment merely because it still works.

This foundryman will present our industrial economy with castings embodying a new concept of physical, metallurgical and optical quality. He will demand and get more highly controlled composition ingot. Thus, he will be able to certify the alloy physical and chemical analysis of all castings to the consumer and to offer the castings on a quality-unit rather than a price-per-pound basis, taking into consideration the lesser machining and processing required and the freedom from rejection.

The castings will be made of alloys having physicals approximately twice the current published data; they will be vacuum, atmosphere, or pressure cast of electrically melted metal in resinbonded or nonorganic inclusion-free molds, under electronically controlled conditions. The foundryman will re-evaluate other alloys and metals that are gaining accelerated consumer acceptance and in some cases, preference.

Some of these metals and alloys, such as aluminum, magnesium, beryllium, cobalt-nickel-chrome, nickel, molybdenum and titanium, have already replaced copper-base alloys in some instances. In fact, annual world consumption of aluminum will increase to half a million tons more than copper by 1960 and cost approximately one-half as much. Magnesium's excellent strength-to-weight characteristics, plus unlimited supply, will be a natural for the nonferrous foundryman, who will find that it is not as hazardous to cast as was once supposed.

Our technological foundryman of the near tomorrow will utilize engineering talent of his own to develop and set up special custom tooling such as patterns, rigging, molding equipment and layouts for his own particular operations that will be far advanced compared with the foundry equipment of today.

He will have established a department independent of the remainder of the foundry. It will act as a pilot plant, manned by qualified engineering graduates uninhibited by old mores and able to evaluate old and new processes and procedures in controlling jobbing and production runs.

He will also employ new tools of inspection and other methods of control in his own laboratory or in highly integrated commercial laboratories offering quick and efficient service.

He will have at his command new metal pattern techniques that offer better quality and more accuracy at lower cost. The use of plastic and glass-laminar patterns will take precedence over wood patterns and lend themselves to standard procedures and shell-molding techniques utilizing low-temperature polymerization resins.

Must Adopt New Methods

Many foundries will have their time fully occupied just attempting to keep their operations to the level now existing in many progressive and aggressive foundries. This means that the small foundry, composed of an owner-molder and several helpers, will fall prey to technological advances and fail to survive unless it, too, assimilates, interprets and applies the voluminous data, effects, and changes that are sweeping our nonferrous foundry horizon.

In a materialistic world where the consumer has been assiduously catered to as a discontented wanter of perfection, the nonferrous foundryman of tomorrow must of necessity offer castings having greater intricacy of detail and design, closer tolerances than the present 1/16-3/16 in., less abrasive surface inclusions, no micro-macro porosity and shrinkage, dependable and higher metallurgical analysis and specifications, better alloys, more standard conformity, and lower economic utility pricing.

Thus, the far-sighted foundryman who operates in the oldest of the arts and the youngest of the sciences can see that the unprecedented release of new materials and processes will cause near future markets to be in the greatest flux in man's history. What this will do to the "commercial quality" nonintegrated foundry when it is projected into the world of 1960 can only be summed up in a parody-quotation from Omar Khayyam:

"And if the sand you ram, pattern you press,
End in what All begins and ends in—Yes;
Think then you are Today what Yesterday
You were—Tomorrow you shall be less."

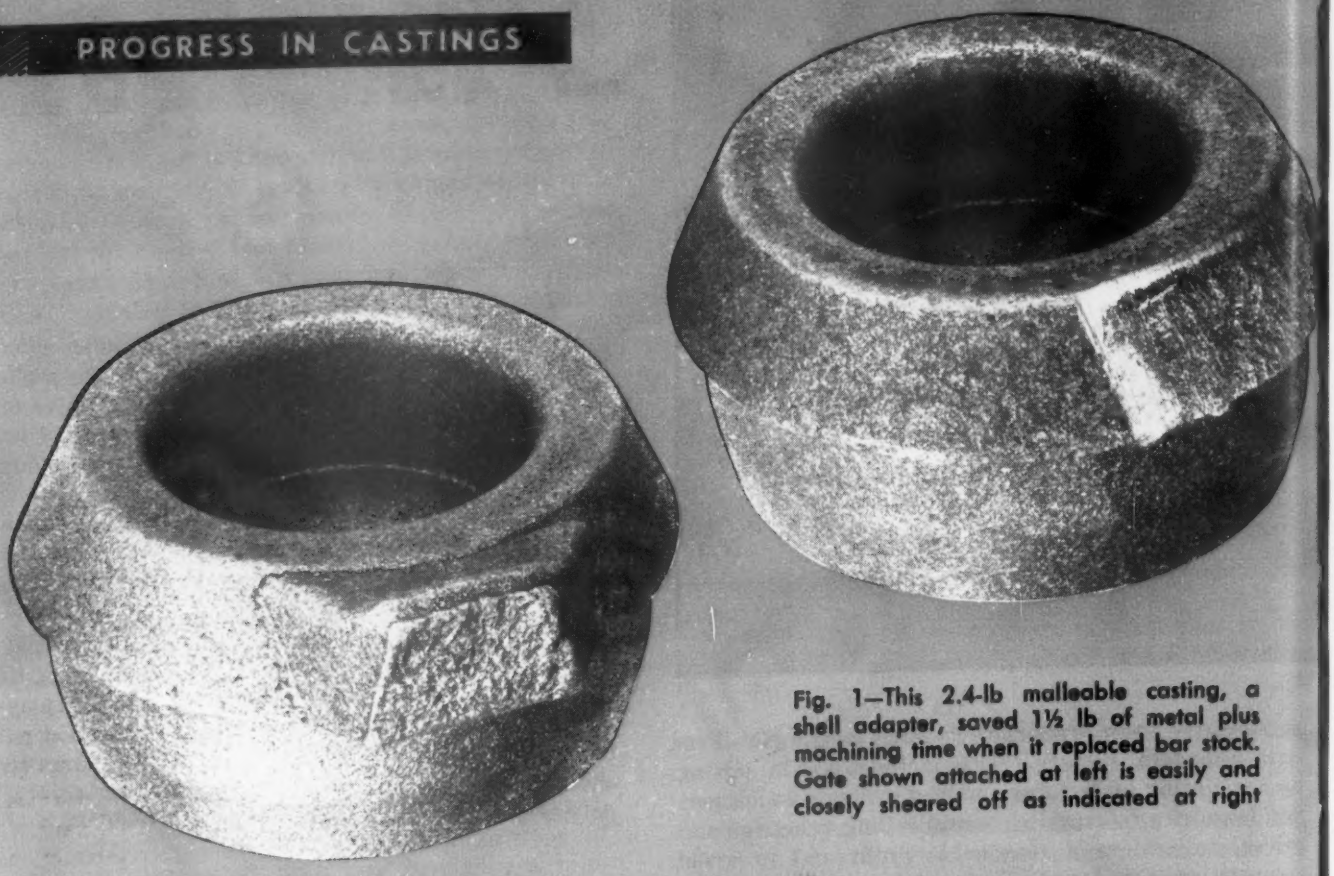


Fig. 1—This 2.4-lb malleable casting, a shell adapter, saved 1½ lb of metal plus machining time when it replaced bar stock. Gate shown attached at left is easily and closely sheared off as indicated at right

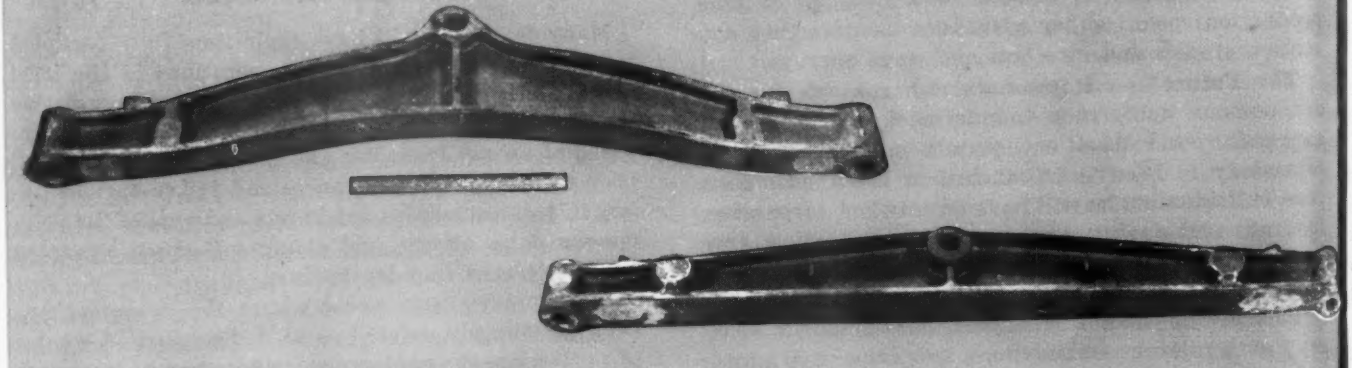


Fig. 2—These cast axles for farm tractors were formerly made of several welded pieces

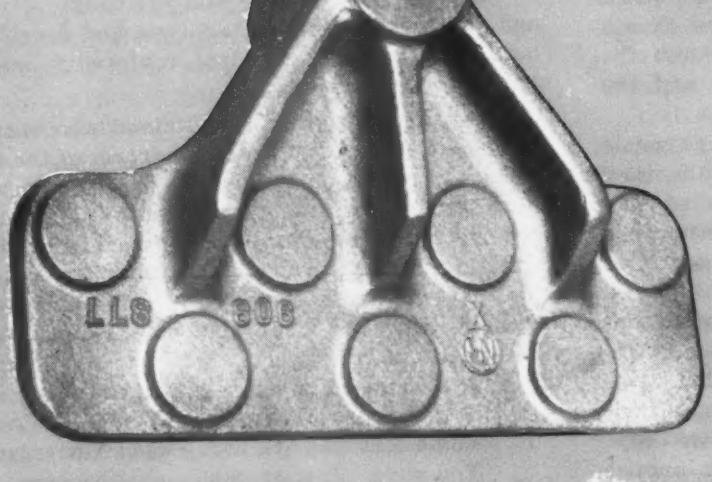


Fig. 3—Malleable iron hinge weighing 6 lb which replaced a weldment

Malleable Iron Castings

Accelerated research activities in ways to improve and standardize malleable foundry operations include work on core practices, gating and feeding methods, and study of the effect of various atmospheres on melting and annealing. Pearlitic malleable iron castings find broader applications as additional foundries engage in production

By JAMES H. LANSING
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DURING World War II, malleable castings became recognized as an important factor in armament. Many, in the Ordnance Department and elsewhere, had rather taken for granted that automotive equipment was made of "steel," with a gray iron engine block. When they became involved in the procurement and effective utilization of materials, however, they learned that steering gear housings, differential carriers, differential cases, bearing caps, hubs, spring-hangers and many other parts, are made of malleable iron.

They also learned the reasons for this—malleable's versatile castability and uniformity of structure, the fact that it has high notch fatigue properties, resistance to impact, toughness, but is easily machined. Many automobile accidents would be serious rather than minor ones were it not for the toughness and impact resistance of malleable steering gear housings, differential carriers and differential cases. Car control of steering is maintained when the steering housing does not fail and car power and drive control are maintained when the differential housing is of malleable and does not break.

As the war-necessity of conserving machine tools, material and man-hours became more urgent, many pieces originally machined from bar stock or solid forgings were converted to malleable. Thus time, equipment, man-hours, metal and expense were saved. Machine gun mounts and cradles, mortar castings, field range castings, gun control and pedestal castings, torpedo warhead rings, shell adapters, and lifting plugs were among the many and diverse wartime uses of malleables, in addition to the many truck and combat vehicle parts.

An example of saving, through malleable use, is the 1.2 shell adapter, Fig. 1. A 2.4-lb malleable casting replaced 3.9 lb of bar stock. One and one-half pounds of metal were saved in the manufacture of each shell. And the machine tool time and man-hours required to cut away the useless 1.5 lb of metal were also saved. Malleable castings thus prevented the useless waste of hundreds of tons of metal and thousands of hours of man and machine time. At left, the casting is seen to have its original substantial gate, insuring solid feeding. At right, the gate has been easily and closely sheared off the casting, demonstrating that although tough, malleable is also easily machined.

When, in 1946, World War II ended, armament requirement for malleables came to a sudden halt. Immediately, however, large civilian requirements for malleables again manifested themselves and the 900,000-ton production of 1947 exceeded that of 1946. In only one of the ensuing five years, did production fall below 900,000 tons. In that year, 1949, general industrial activity was off and malleable production followed the general trend in dropping some 20 per cent. In 1951, over 1 million tons of malleable iron castings were produced, and 1952 production was maintained well over the 900,000 mark.

The year just past has been one in which the malleable industry has devoted itself unceasingly to research. Part of this research work has been for the purpose of effecting immediate improvement and economies in operations. Part has been of a longer range type for the purpose of further improving and standardizing operations, practices, and results, by a multi-year program of investigation and study. This work has been carried on by the Malleable Founders' Society, through studies at engineering schools and by consulting specialists; also by co-operative work of member companies. As a result, considerable progress has been made in further improving industry core practices. At the same time, a long-range program in connection with effective gating and feeding methods has been undertaken.

The Malleable Division of the American Foundrymen's Society is also engaged in a comprehensive study of the effect of various atmospheres in melting and annealing. Developments to date have led to a further extension of the investigation. All of this research work should redound to the advantage of both producers and users of malleable.

While basic production types of malleable castings for the next few years should make no radical departure from those of the immediate past, many new applications should be added and tonnages increased accordingly. For improved appearance and economy, the agricultural tractor axle castings, Fig. 2, formerly made of several welded pieces are now produced as

malleable castings. The two parts weigh 67 lb and 73 lb, respectively. Another weldment replaced for the same reasons is the well designed 6-lb hinge casting shown in Fig. 3.

One part of the industry's field in which there should be marked growth is that of pearlitic malleable. Possibilities of pearlitic malleable irons were first called to the attention of industry by the late Prof. Enrique Touceda, former consulting engineer of the Malleable Founders' Society, in a paper presented to the American Society of Mechanical Engineers in 1919. Following development work by Lauenstein, Hayes and others, pearlitic malleable became a standardized and useful material, now being produced in large tonnages. For the past five years, its production has increased steadily although still amounting to less than 10 per cent of the production of standard malleable. During the past year, an increasing number of malleable foundries equipped themselves to produce the pearlitic material. Its field is increasing wherever rigidity, high strength and wear resistance are important factors. In the grades covered by ASTM Specification A 220-50, the ultimate strength ranges from 60,000 to 90,000 psi minima, the elongation in the former being a minimum of 10 per cent and in the latter a minimum of 2 per cent. Yield point values range from 43,000 to 70,000 psi minima.

A comparison of the ASTM Specifications for standard malleable A 47 and pearlitic malleable A 220, should indicate the fields in which each serves to best advantage. These specification requirements are shown in Table I.

In the two A 47 grades of standard malleable are indicated their values of good strength, relatively high yield point and elongation. Versatile castability, toughness and resistance to impact, excellent fatigue resistance, good vibration damping properties and excellent machinability, make standard malleable the answer to economy and effective quality in many automotive, farm implement, railroad, ordnance and general industry components. Diversity of malleable application is illustrated by the castings of various sizes and types shown in Fig. 6.

TABLE I—ASTM Specifications for Standard and Pearlitic Malleable Irons

A 47-52—STANDARD MALLEABLE CASTINGS

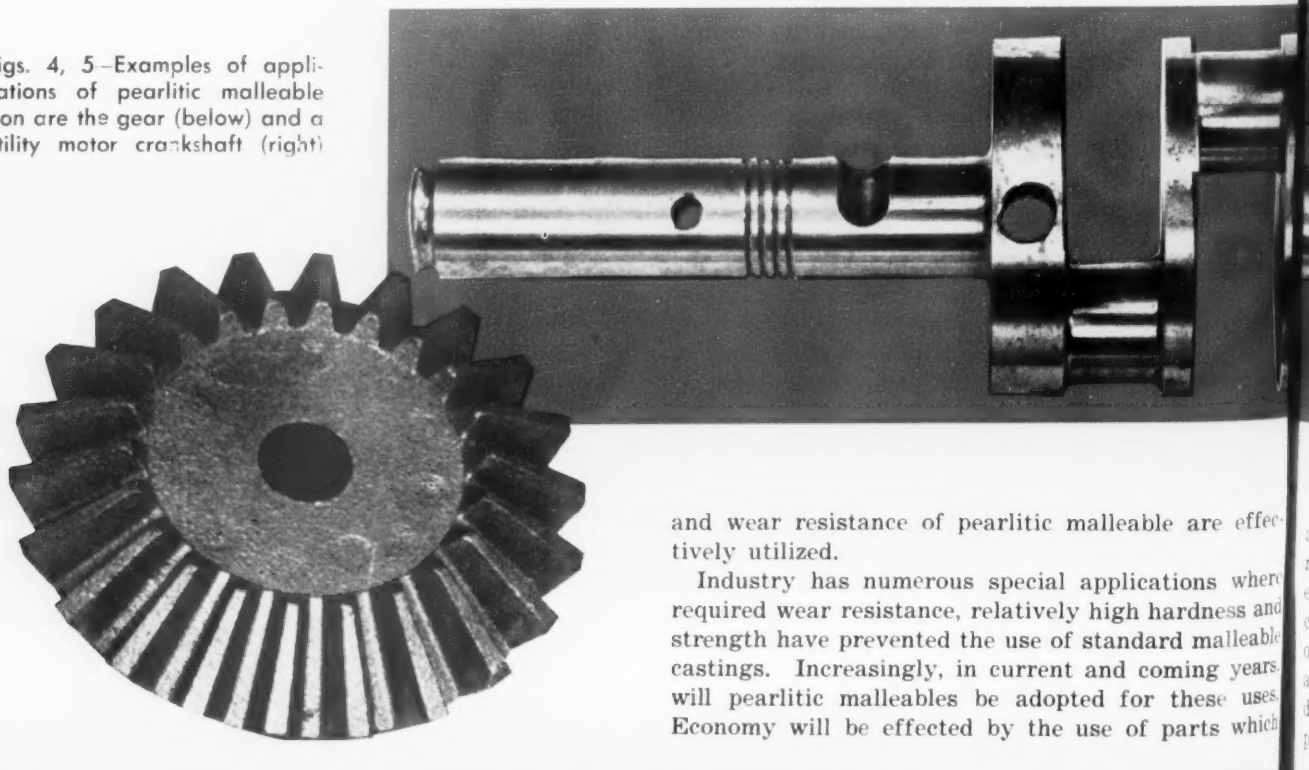
Grade	Tensile Strength, psi (Minimum)	Yield Point, psi (Minimum)	Elongation % in 2 in. (Minimum)
#32510	50,000	32,500	10.0
#35018	53,000	35,000	18.0

A 220-50—PEARLITIC MALLEABLE CASTINGS

Grade	Tensile Strength, psi (Minimum)	Yield Point, psi (Minimum)	Elong., % in 2 in. (Minimum)	Typical Bhn Range
43010	60,000	43,000	10	163-207
48005	70,000	48,000	5	179-228
53004	80,000	53,000	4	197-241
60003	80,000	60,000	3	197-241
70002	90,000	70,000	2	241-285

*It is recognized that higher tensile and higher yield strengths may be obtained from any of the grades of material in the table by the use of a conventional quench-and-temper treatment.

In the various A 220 grades of pearlitic malleable are found the answers when extra wear resistance, high hardness values and accompanying higher strengths are required while still retaining good toughness, castability and good machinability for the hardness values involved. In such applications lower elongation values are not generally a disadvantage. Typical automotive uses are valve rocker arms, automatic transmission parts and universal joint yokes. In the farm implement field, cast gears, gear blanks and housings are important uses. Conveyor sprockets, and machine gun slides are other typical uses. Fig. 4 shows an as-cast gear where the strength, toughness and wear resistance of pearlitic malleable are effectively utilized.



Figs. 4, 5—Examples of applications of pearlitic malleable iron are the gear (below) and a utility motor crankshaft (right)

Industry has numerous special applications where required wear resistance, relatively high hardness and strength have prevented the use of standard malleable castings. Increasingly, in current and coming years, will pearlitic malleables be adopted for these uses. Economy will be effected by the use of parts which

Fig. 6—Diversity of malleable iron's use is indicated by these castings of various sizes and shapes

are originally cast and thus require a minimum of machining. What machining is required will be more economically performed, for pearlitic malleables machine with greater ease than do forged or rolled parts of equal indentation hardness. The increased availability of the product and its more widespread production should act as a further stimulus to increased pearlitic malleable use. Fig. 5 shows a utility motor crankshaft where the castability, machinability, strength and wear resistance of pearlitic malleable combine to produce a high-quality but low-cost part.

Greater general use of standard malleables should go hand in hand with increased knowledge of their possibilities. Engineering school faculties are doing a better job of acquainting students with malleable possibilities than in the past. In this the malleable industry has assisted by supplying aids to instruction. These include technical display charts, sample malleable specimens, "Malleable Iron Facts" bulletins, handbooks, and a sound and technicolor film on malleable casting metallurgy, production and use, entitled "This Moving World."

A further impetus to knowledge of malleables and

Fig. 7—Grips used in binding heavy loads, a new application for malleable iron castings

Fig. 8—Insulator casting illustrates ease with which holes may be punched in malleable and flanges coined

their use has resulted from the increased "foundry" instruction now being given in many engineering schools. Students who include such courses in their studies may either become foundry engineers or put their training to good use in furthering the effective application of castings, in whatever branch of industry they may be employed. The malleable casting industry, through its contribution to, and support of, the Foundry Educational Foundation has aided directly in this work.

New uses for malleable castings are constantly developing. One, which illustrates the facility with which two parts may be interlocked by taking advantage of the toughness and ductility of the product, was recently pictured in *Fortune*. As shown in Fig 7, it is seen to assure proper contact by load binding chains, whether the material to be bound is cylindrical or rectangular. These load grips are being produced in 100,000 quantities, indicating the value of their use.

Malleable foundries are devoting attention to shell molding, not as something to which anything approaching their entire production should be converted, but rather for effective use in special applications. Of at least equal interest are high-pressure molding possibilities which should aid in maintaining close dimensional tolerances and in eliminating or reducing certain machine operations. Further developments indicate that similar results may be accomplished by the use of certain additives to sand with pressures much less than those employed in high-pressure molding. An example of malleable's versatility in connection with dimension control is the fact that it is adaptable to coin pressing operations, which also may eliminate certain machining operations.

Illustrative of the ease with which holes may be punched in malleable and flanges coined, is the insulator casting shown in Fig. 8. This 11½-lb malleable iron casting has a coin-pressed flange, also four holes punched in the flange. By coining, it is possible to hold small castings to plus or minus .007-in., or even to closer tolerances.

Fig. 9—Malleable iron casting used to demonstrate fracture resistance at low temperature

Fig. 10—Automotive and miscellaneous applications of malleable iron castings

Malleable foundries are regularly improving their efficiency in material handling. Where production is large and continuous, extensively mechanized operations are warranted, including continuous power conveying of sand, molds, metal and castings. If the quantity production is not as great, and job changes are more frequent, pallet and roller conveyor equipment is utilized to advantage. Even the smallest foundries make effective use of small motorized shop trucks and other labor-saving devices, for handling sand, castings and miscellaneous materials.

In annealing operations, gas-fired radiant tube ovens of continuous or batch type are increasingly employed; this is equally applicable to electrically heated ovens of various types. Many foundries, however, find their production still well adapted to pulverized coal or oil-fired periodic ovens in which the castings are protected and distortion prevented by packing in pots.

Gravity sand hoppers, to eliminate sand shoveling when making molds, are being more widely adopted. With improvements in mold and coremaking machines, the near future may find many molding operations becoming completely automatic.

Work on the behavior of malleable iron at low and elevated temperatures continues to indicate that the material is affected little by substantially high or subzero temperatures. Low temperature tests of malleable for a subzero application were reported by the writer at the ASME, 1952 Fall Conference. The casting shown in Fig. 9 was chilled to minus 70° F and tested by use of a small drop hammer which struck it a 60-foot-pound blow over an inverted V-block. After every two blows, the casting temperature was again checked and maintained at minus 70. Following 12 blows, the mouth of the casting had opened up, as shown at left in Fig. 9, and had bottomed on the V-block, but the casting had not fractured. Excellent low temperature impact resistance was thus demonstrated and such use of the part was approved.

With increasing realization of malleable iron's properties its uniform strength and toughness in both light and heavy sections, ease of machining and resultant economy in manufacture—with the broadening field of pearlitic malleables; with increased realization that the casting of a very fluid metal, which is made tough and impact resistant, is the most effective way to produce most desired parts; and with malleable castings holding their present field and steadily increasing their uses, the malleable industry should be entering a period of increased usefulness and productivity.

(Above)—Pouring a magnesium casting from a ladle holding 700 pounds of metal. Experience has been gained in production of relatively large castings

(Below)—Cores for magnesium casting entering a dielectric oven. Low heat content of magnesium requires use of cores having high collapsibility

Rolle Mfg.

Magnesium Castings

Considerable success has attended the application of magnesium castings to aircraft needs. Helping foundries in developing this and other uses have been availability of new alloys, adoption of new core binders, the perfection of gating techniques, and improvements in grain refinement

By T. E. LEONTIS and H. E. ELLIOTT
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THE most significant magnesium foundry development following World War II has been the performance of magnesium foundries in adapting themselves to the needs of the aircraft industry. The major accomplishment has been the success of the industry in developing techniques to produce the intricate engine castings and other parts that have been required by a rapidly growing industry. The true measure of the job performed lies in the diversity and tremendous complexity of castings produced and the extreme quality standards that have been met.

Two factors have been primarily responsible for the accomplishments of the magnesium foundry industry. The first and foremost is the basic high castability of magnesium alloys. Much attention has been given to special problems connected with handling this relatively new material. But what other material has matched the performance of magnesium alloys in producing castings of the complexity and quality required for modern aircraft engines?

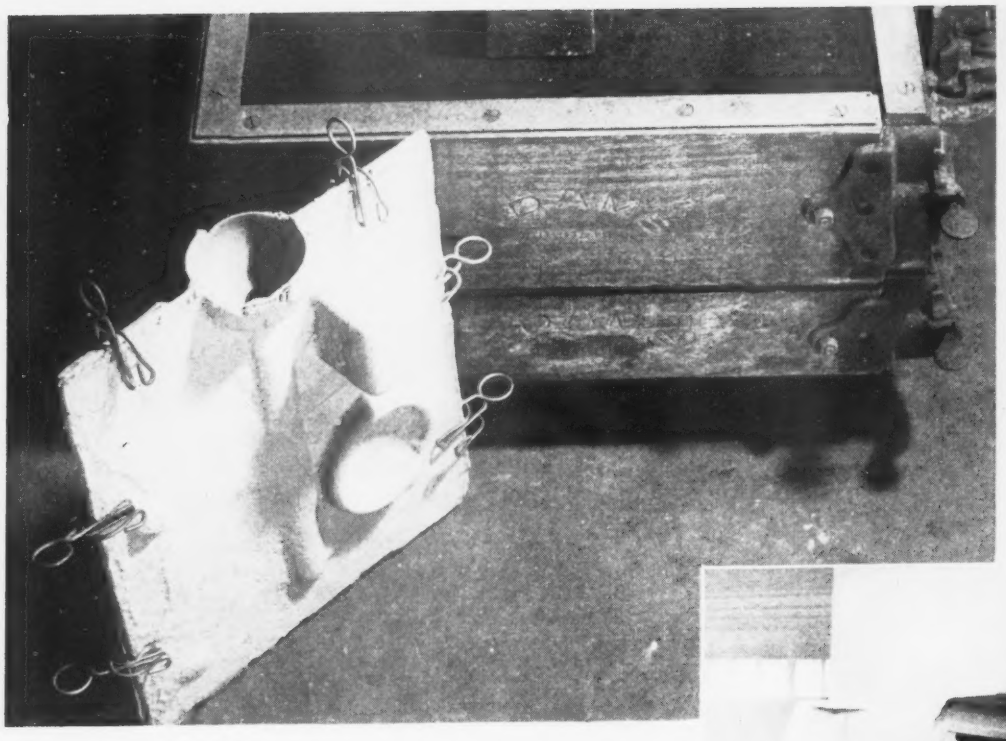
The second factor explaining these accomplishments is the resourcefulness of the people who have been involved. To produce the many unusual shapes required, foundrymen had to make innovations in their practice—innovations consistent with the basic principles of casting metal and with the particular properties of these alloys. The most significant of these innovations has been the development of suitable gating techniques. There are no handbooks from which a foundryman can obtain the detailed information as to gating techniques that will lead to a sound casting. Instead, by adhering to the basic principles of fluid flow, shrinkage behavior of solidifying metal, and control of the rate of heat dissipation, foundrymen in the magnesium industry design the gating of each casting as a problem in itself. The character of the product they have produced speaks well for their skill and for the basic castability of the material.

New alloy developments since World War II have also contributed to the success of magnesium castings in meeting the changing requirements of the aircraft industry. Such developments were dictated by the higher operating speeds and temperatures of jet aircraft. While it had been known earlier that the addition of rare earths in the form of mischmetal to magnesium produced alloys with outstanding tensile and creep properties at temperatures in the neighborhood of 400°F, the early work with these alloys produced castings that were coarse-grained, leading to much trouble with hot cracking during solidification and to breakage in processing the castings.

Further research led to the introduction of the magnesium-rare earth alloys containing zirconium. The zirconium addition refined the grain sufficiently to allow the production of sound, complex castings with the desired properties. Since these discoveries, the magnesium-rare earth-zirconium alloys have become accepted as standard for aircraft castings both by American and British aircraft engine producers.

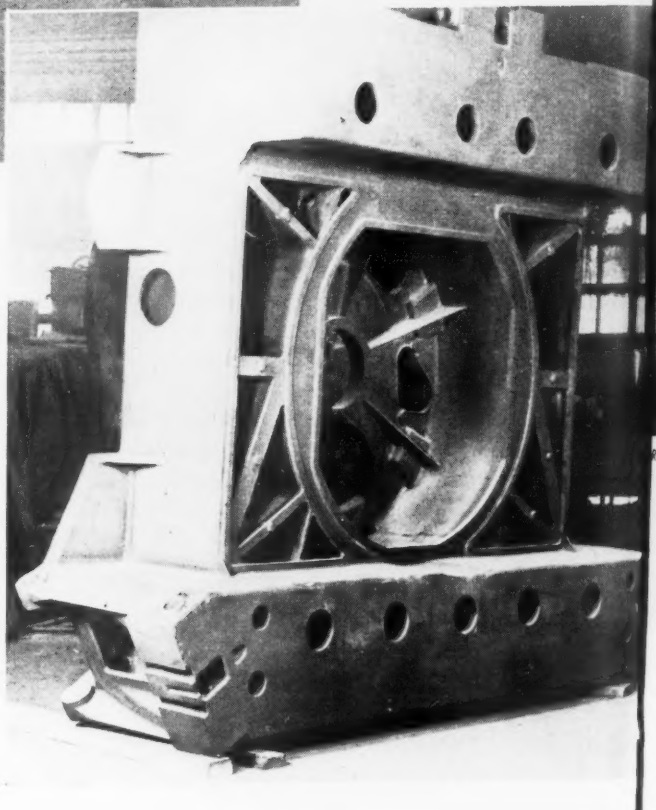
As jet engine design continues to evolve, the operating speeds and temperatures are increasing. Illustrative of the capacity of the magnesium foundry industry to adapt itself to changing requirements has been the development of the new magnesium-thorium-zirconium alloys. These new alloys provide excellent tensile and creep properties at temperatures as high as 500 to 600°F. While these alloys have not reached volume production as yet, more and more castings in these alloys are currently undergoing service tests.

A major development of foundry techniques in the magnesium foundry industry in recent years, one that has contributed markedly to the successful production of complicated magnesium castings is the use of plastic binders for cores. Previously used core binders required baking at a relatively high temperature, which resulted in the baking out of some of the inhibitors. Using plastic binders of the urea formaldehyde type the baking temperature at which the resins polymerize is fairly low and the inhibitors



(Left) — Showing comparison between shell mold and conventional mold prior to pouring

(Below) — This magnesium sand casting weighs 1630 lb. It required a total of 197 cores and measures 114 x 93 x 33 in. The part is a base for an electronic unit



are not baked out. Sand mixes employing plastic binders have been adapted readily to the core blowing process—an important factor in decreasing costs of magnesium castings.

The plastic binders lead to greater collapsibility of the cores. Because magnesium has a lower heat content than other structural metals, there is not as much heat available to break down the core binders. With oil bonded cores, the sand offers a great deal of restraint to casting shrinkage because the binder does not adequately break down. In intricate magnesium castings there was great difficulty in knocking out internal cores before the development of the plastic resins as binders.

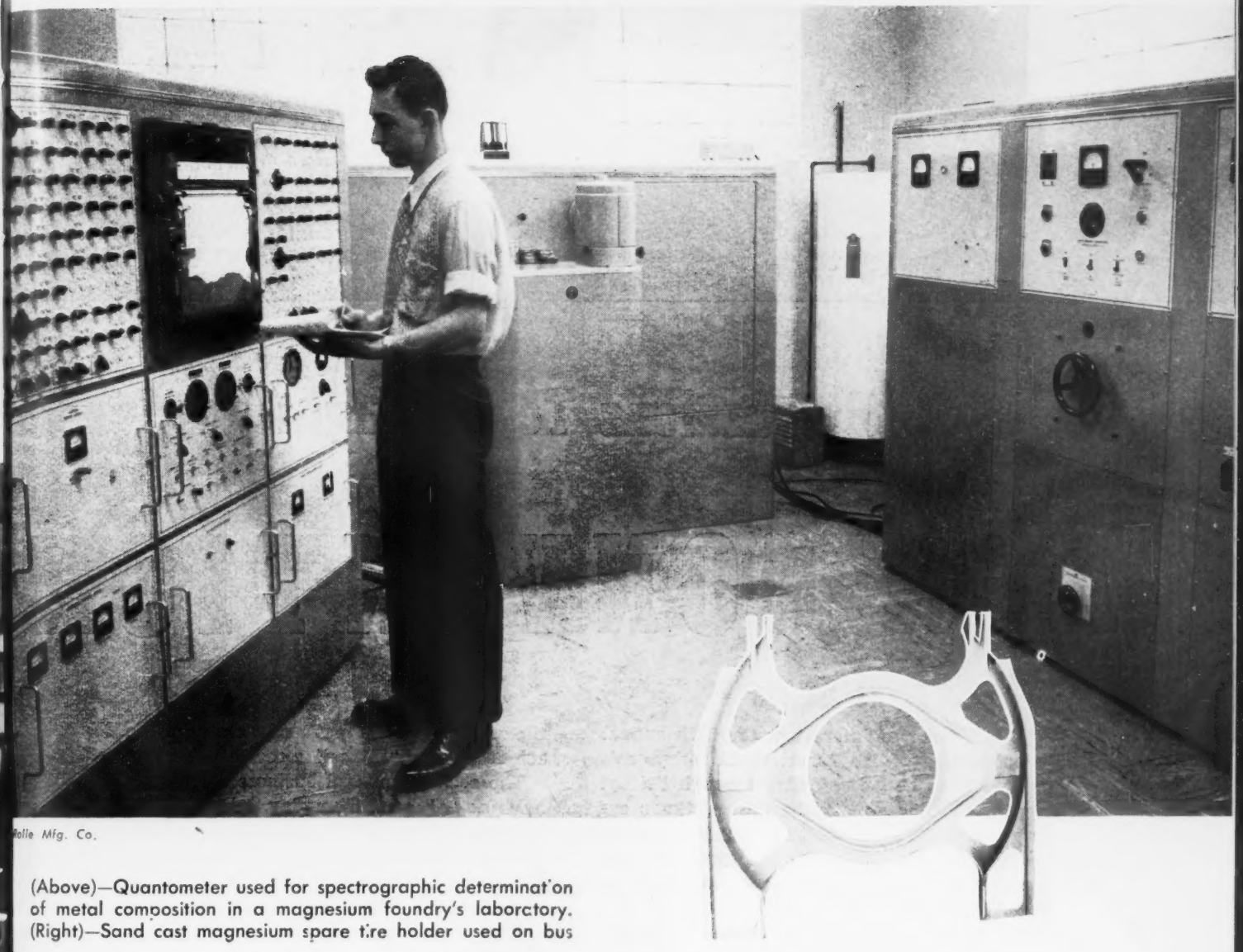
Inasmuch as grain size is an especially important factor in the strength and castability of metals, a great deal of research has been undertaken in grain size studies and methods of grain refining.

Certain general conclusions have been drawn and the results published in recent years. In summary of these conclusions it can be said that magnesium casting alloys as commonly processed have a unique fine-grained structure that gives high mechanical properties and contributes importantly to their basic high castability.

At least three major methods of grain-refining have been advanced that give excellent results in commercial operations. These methods are: Superheating, carbon or carbonaceous inoculation, and violent agitation plus carbonaceous inoculation. The most outstanding success with carbonaceous inoculation is achieved by the direct addition of carbon, hexachlorethane, hexachlorobenzene, or calcium carbide. Superheating still is used extensively but this method is being replaced in many foundries by the carbon inoculation process.

Some of today's newest developments already show clear promise of becoming large volume production processes in the future. Extremely large magnesium castings that have been produced recently for military electronic units may well be the forerunner of large cast magnesium housings for all types of electrical equipment. Such parts can be cast accurately, with intricate coring and produced in volume.

Another recent development that shows great commercial promise for the future is the development by some foundries of methods for producing unusually thin-wall parts of considerable complexity and with exceptional surface smoothness. One such process, known in some quarters as the "Osbrink process," has had significant initial successes in replacing complex fabricated assemblies for the air frame and electronic equipment industries by sand-cast parts, and where applicable has yielded great cost advantages over the conventional methods of fabrication.



Nolle Mfg. Co.

(Above)—Quantometer used for spectrographic determination of metal composition in a magnesium foundry's laboratory. (Right)—Sand cast magnesium spare tire holder used on bus

Another process showing considerable promise of successful commercial application to magnesium is the Antioch process for plaster casting. This process, too, is designed to permit the running of extremely thin walls, at the same time achieving excellent surface finish and greater precision than can be attained by conventional sand casting.

The shell molding process is another method that may find important usage by founders of magnesium. This is another method that promises to save costs by yielding superior surface finish and dimensional precision, thereby reducing machining costs.

These various new casting methods are being intensively studied at the present time, and each will find its natural place in the years ahead, as magnesium foundries continue the process of adapting themselves to the needs of their customers.

At present the largest consumers of magnesium castings are the aircraft and military electronic industries. The most challenging field of future development might very possibly be the adaptation of these new magnesium casting processes to the production of magnesium castings for consumer and industrial markets. Because of the great interest of the military in magnesium castings, the civilian market has not been fully explored except in the case of portable power tools and foundry equipment. It can now be said, however, that by virtue of the competitive position of magnesium with respect to other metals, the future looks promising in the field of business machines, automotive parts, and lightweight, complex housings for electrical equipment.

The magnesium industry has met the stringent demands of the aircraft industry in producing castings of the quality and complexity demanded by that industry with properties consistent with the use of the part. There is every reason to think that the two major assets of the magnesium industry—the high basic castability (and otherwise useful properties) of the material, and the resourcefulness of the men who have been working with it—will stand the industry in good stead in its adjustment to future economic trends. The magnesium casting industry has matured in the years since World War II, but it has lost little of the energy and progressiveness of youth. It is an industry that is still looking forward to new opportunities—one that has shown great capacity to adapt itself to changing needs.

Technical Discussions To Highlight

AFS CONVENTION

FOCAL point of interest at the 57th annual convention of the American Foundrymen's Society to be held Monday through Friday, May 4-8, in Chicago, will be the meeting's extensive technical program. The regular biennial exhibit of foundry equipment and supplies is not scheduled until the 1954 convention in Cleveland.

At Chicago, technical sessions, informal luncheon discussions, evening shop courses and plant visitations promise a full five-day program covering latest developments in numerous phases of the ferrous and nonferrous branches of the castings industry.

Most of the sessions will be held at the Sherman Hotel, which also will be registration headquarters. Registration fees are $2 for AFS members, $5 for nonmembers. No fee is required of members or nonmembers attending the evening shop courses.

Other convention features will be an entertainment program for lady visitors, the Non-Ferrous Founders' Society annual dinner Monday evening and the Canadian dinner and Educational dinner Tuesday evening.

The annual AFS banquet, scheduled for Wednesday evening at Hotel Morrison's Terrace Casino, will be the occasion for the society's awarding of gold medals and honorary life memberships. Details on the recipients are given on page 160 of this issue. Banquet speaker will be Dr. George S. Benson, president, Harding College, Searcy, Ark., who is attempting to educate both students and the public in learning the advantages of the American way of life. His subject will be "Education for Free Enterprise."

The society's annual business meeting will be held at 10 a.m. Thursday. President I. R. Wagner will give the president's annual address, apprentice contest awards will be made and officers and directors for 1953-54 will be elected. Nominees are:

President—Collins L. Carter, president, Albion Malleable Iron Co., Albion, Mich., and present AFS vice president. Vice president—Frank J. Dost, president, Sterling Foundry Co., Wellington, O. Directors for three-year terms—E. C. Hoenicke, Foundry Division, Eaton Mfg. Co., Detroit; Martin J. Lefler, Oliver Corp., South Bend, Ind.; C. V. Nass, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago; Victor F. Stine, Pangborn Corp., Hagerstown, Md., and G. Ewing Tait, Dominion Engineering Works Ltd., Montreal.

The Charles Edgar Hoyt Annual Lecture will be given immediately following the business meeting by James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich. Mr. Smith will talk on "Outstanding Opportunities for the Foundry Industry."

Past AFS presidents will meet for their annual breakfast on Wednesday morning and past and present officers, directors, medalists, and honorary life members will attend the AFS Alumni Dinner on Thursday evening.

The complete technical program is presented on the next five pages, and committee members

appointed by the host Chicago chapter to handle various convention arrangements are listed on pages 157-159.

Shell Molding currently is of particular interest, and three AFS divisions feature papers and discussions on the subject. The Light Metals Division deals with the subject first at a roundtable luncheon Monday. In addition to a discussion session on the subject, a paper entitled "Casting Magnesium Alloys in Shell Molds" will be presented.

On Tuesday morning the Pattern Division offers two papers: "Patterns for Shell Molding" and "Pattern Equipment for Shell Molding." In the afternoon of the same day the Sand Division offers two: "Resins and Sands for Shell Molding" and "Progress Report, Shell Molding Materials Testing." The Sand Shop Course that evening features a discussion on the evaluation of molding processes in which shell molding will be covered.

Titanium melting and casting are covered at an AFS convention for the first time in several papers sponsored by the Light Metals Division. They are: "A Technique for Casting Titanium," "Mechanical Properties of Cast Titanium-Carbon Alloys," "Evaluation of Mold Materials for Titanium Castings" and "Preliminary Survey of Some Metallurgical Bases for a Titanium Castings Industry." Two sessions on Tuesday afternoon are devoted to the subject.

Air Pollution Control is given attention at Safety, Hygiene and Air Pollution Sessions. Papers include: "What Are Future Air Pollution Prospects for the Foundry Industry?", "Know Your Problem for Your Community," "Air Pollution Control Equipment Available for the Foundry Industry," to be presented Tuesday afternoon. At a Wednesday morning session the division will offer its progress report plus a paper on "Noise in the Foundry." In the afternoon will be a paper on "Trends of Dust Control—Past, Present and Future."

Fluid Flow is covered at sessions of two divisions. The Light Metals Division on Tuesday morning offers "Velocities and Volume Rates of Metal Flow in Gating Systems" and "Practical Foundry Applications of Principles of Ratio Gating." At the Brass and Bronze Division roundtable luncheon that noon a motion picture entitled "A Brief Study of Fluid Flow in a Small Cylindrical Casting" will be shown.

Ductile Iron draws attention at two Gray Iron Division sessions. Thursday afternoon the paper, "Hardening Characteristics of Induction Heated Ductile Iron," will be presented; for Friday afternoon the paper titles will be: "Effect of Magnesium on Eutectic Modification and Graphitization of Certain Fe-C Alloys" and "Prediction of Mechanical Properties from Chemical Composition for Fully-Annealed Ductile Cast Iron."

Basic Cupola Operation comes up for discussion at the Gray Iron Division session Wednesday afternoon. Title of the paper is "Dephosphorization of Iron—Basic Cupola Operation."

Shop Courses will start at 8 p.m., Monday, Tuesday and Thursday evenings. Courses will be presented by the Brass and Bronze, Gray Iron and Sand Divisions. Subjects to be covered include melting practices in various types of furnaces, casting defects, molding processes and the keeping and application of foundry records.

Ladies' Entertainment program features a reception and tea at the Sherman Hotel on Monday. Luncheon and style show at Marshall, Field & Co. is scheduled for Tuesday. On Wednesday luncheon and a puppet opera will be held at the Kungsholm Scandinavian Restaurant, and a tour of the Art Institue of Chicago and tea are planned for Thursday. Ladies registration headquarters will be at the Sherman Hotel.

Plant Visitations are varied and complete, including equipment and supply manufacturers as well as ferrous and nonferrous foundries of small, intermediate and large capacities, both mechanized and unmechanized. Partial list of plants, days and hours that they will be open to visitors, and the attractions they offer will be found on page 302.

MONDAY, MAY 4

8:30 a.m.—Registration begins

10 a.m. (A)—Brass and Bronze Session
Presiding—F. L. Riddell, H. Kramer & Co., Chicago. Co-chairman—J. G. Dick, Canadian Bronze Co., Ltd., Montreal.
Properties of Graphitic Nickel Alloy Castings—J. T. Eash and G. L. Lee, International Nickel Co. Inc., Bayonne, N. J.
Brass & Bronze Research in Progress: *Mold Interface Reactions*—W. B. Scott, National Bearing Div., American Brake Shoe Co., Meadville, Pa. *Effect of Casting Defects on Physical Properties*—B. N. Ames, New York Naval Shipyard, Brooklyn, N. Y.; *Metal Penetration in Cores*—R. B. Fisher, Ingersoll-Rand, Phillipsburg, N. J.; *Manganese Bronze Test Bars*—R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Barber, N. J.

10 a.m. (B)—Light Metals Session
Presiding—A. T. Peters, Dow Chemical Co., Bay City, Mich. Co-chairman—W. D. Danks, Howard Foundry Co., Chicago.
Magnesium Sand Casting Alloys Containing Thorium—K. E. Nelson, Dow Chemical Co., Midland, Mich.
Characteristics of High Strength Magnesium Casting Alloy ZK 61—J. W. Meier, Department of Mines and Technical Surveys, Ottawa, Canada.

10 a.m. (C)—Malleable Session
Presiding—W. G. Ferrell, Auto Specialties Mfg. Co., St. Joseph, Mich. Co-chairman—L. E. Roby, Peoria Malleable Casting Co., Peoria, Ill.
Mechanics of Foundry Mechanization—R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.
Multiple Molding in a Malleable Shop—J. G. Kropka, Chain Belt Co., Milwaukee.

12 noon (A)—Light Metals Roundtable Luncheon
Presiding—F. P. Strieter, The Dow Chemical Co., Midland, Mich.
Casting Magnesium Alloys in Shell Molds—N. Sheptak, Dow Chemical Co., Midland, Mich.
Shell Molding: Discussion leaders—Aluminum, J. L. Schmieder, Jr., Oberdorfer Foundries Inc., Syracuse, N. Y. Magnesium, A. J. Marotta, Utica Radiator Corp., Utica, N. Y.

2 p.m. (A)—Brass and Bronze Session
Presiding—W. M. Ball, Jr., R. Lavin & Sons, Chicago. Co-chairman—F. L. Riddell, H. Kramer & Co., Chicago.
Fracture Test Symposium—Panel: C. A. Robeck, Gibson & Kirk Co., Baltimore, H. H. Fairfield, Wm. Kennedy & Sons, Ltd., Owen Sound, Ont., C. K. Faunt, Christensen & Olsen Foundry Co., Chicago, B. N. Ames, New York Naval Shipyard, Brooklyn.

2 p.m. (B)—Educational Session
Presiding—G. J. Barker, University of Wisconsin, Madison. Co-chairman—W. J. Hebard, Continental Foundry & Machine Co., East Chicago, Ind.
Job Training in the Foundry—E. R. Andrews, Hyde Windlass Co., Bath, Me., T. Miller, Great Lakes Founders & Machine Corp., Ludington, Mich.

2 p.m. (C)—Malleable Session
Presiding—C. O. Schopp, Link-Belt Co., Indianapolis. Co-chairman—N. N. Amrhein, Federal Malleable Co., West Allis, Wis.
Air Furnace Design and Operation—J. E. Rehder, Canada Iron Foundries, Ltd., Montreal.
Effects of Melting Furnace Atmosphere on Casting Properties and Annealability of Malleable Iron—Malleable Research Progress Report—E. A. Lange and R. W. Heine, University of Wisconsin, Madison.

4 p.m. (A)—Light Metals Session
Presiding—W. A. Mader, Oberdorfer Foundries Inc., Syracuse, N. Y. Co-chairman—D. L. LaVelle, American Smelting & Refining Co., Barber, N. J.
Magnesium Alloy Permanent Mold and Semi-Permanent Mold Castings—M. E. Gantz, Jr., E. M. Gingerich and R. T. Woods, Aluminum Co. of America, Cleveland.
Agar Gels in Plaster-Bonded Investment—H. Rosenthal and S. Lipson, Frankford Arsenal, Philadelphia.
Effect of Casting Fiber on Mechanical Properties of Aluminum-4½% Copper Alloys—W. D. Walther, C. M. Adams and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

4 p.m. (B)—Malleable Session
Presiding—Milton Tilley, National Malleable & Steel Castings Co., Cleveland. Co-chairman—J. E. Dvorak, Eberhard Mfg. Div., Eastern Malleable Iron Co., Cleveland.
Influence of Furnace Atmosphere on the Annealing of Malleable Iron—J. T. Bryce, A. Hernandez and F. B. Rote, Albion Malleable Iron Co., Albion, Mich.
Gating to Control Pouring Rate and Its Effect on Castings—F. J. McDonald, Central Foundry Div., General Motors Corp., Saginaw, Mich.

4 p.m. (C)—Sand Session
Presiding—B. H. Booth, Carpenter Brothers Inc., Milwaukee. Co-chairman—G. S. Schaller, University of Washington, Seattle.
A General Look at Nonferrous Molding Sands—C. A. Robeck, Gibson & Kirk Co., Baltimore, and C. A. Sanders, American Colloid Co., Chicago.
Factors Involved in Making a Sand Mixture—D. C. Williams, and D. F. Baker, Ohio State University, Columbus.
Deformation of Green Molding Sand—Committee Report.

Acme

W. G. Parker, Elmira Foundry Co., Elmira, N. Y.

8 p.m. (A)—Brass and Bronze Shop Course
Presiding—R. J. Keeley, Ajax Metal Div., H. Kramer & Co., Philadelphia. Co-chairman—H. M. St. John, Crane Co., Chicago.
Indirect Arc and Resistance Furnaces—B. W. Schafer, Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Low and High Frequency Induction Furnaces—F. T. Chesnut, Ajax Electrothermic Corp., Ajax Park, N. J.
Coal and Coke Fired Furnaces—R. H. Stone, Vesuvius Crucible Co., Swissdale, Pittsburgh.

8 p.m. (B)—Gray Iron Shop Course
Presiding—W. Holden, Eaton Mfg. Co., Vassar, Mich. Co-chairman—E. J. Burke, Hanna Furnace Corp., Buffalo.
Melting Conditions in the Cupola—D. E. Krause, Gray Iron Research Institute, Columbus, O.

8 p.m. (C)—Sand Shop Course
Presiding—F. S. Brewster, Harry W. Dietert Co., Detroit. Co-chairman—K. L. Landgrebe, the Wheland Co., Chattanooga.
Pinholes in Castings—W. B. George, R. Lavin & Sons Co., Chicago, L. E. Emery, Marion Malleable Co., Marion, Ind. and G. R. Gardner, Aluminum Co. of America, Cleveland.

TUESDAY, MAY 5

8:30 a.m.—Registration opens.

10 a.m. (A)—Heat Transfer Session
Presiding—C. E. Sims, Battelle Memorial Institute, Columbus, O. Co-chairman—J. B. Caine, Cincinnati.
Practical Heat Transfer—An Interpretive Report—AFS Heat Transfer Research, W. S. Pellini, Naval Research Laboratory, Washington.

10 a.m. (B)—Light Metals Session
Presiding—T. D. Stay, Reynolds Metals Co., Cleveland. Co-chairman—P. J. Petto, Jr., Fairfield Aluminum Co., Fairfield, Iowa.
Practical Foundry Applications of Principles of Ratio Gating—L. L. Lucas, the Wagner Mfg. Co., Sidney, Ohio.
Velocities and Volume Rates of Metal Flow in Gating Systems—W. H. Johnson, H. F. Bishop and W. S. Pellini, Naval Research Laboratory, Washington.
A Study of Vertical Gating—Light Metals Research Progress Report—J. H. Jackson, J. G. Kura and K. Grube, Battelle Memorial Institute, Columbus, O.

10 a.m. (C)—Brass and Bronze Session
Presiding—W. B. Scott, National Bearing Div., American Brake Shoe Co., Meadville, Pa. Co-chairman—R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Barber, N. J.
A Study in Segregation in Bronze Using a Radioactive Technique—W. C. Winegard, University of Toronto, Toronto, Canada.
Some Factors Affecting Spherical Type Macro Gas Porosity in 85-5-5-5 Bronze—R. B. Fischer, Ingersoll-Rand, Phillipsburg, N. J.

10 a.m. (D)—Malleable Session
Presiding—C. F. Semrau, Illinois Malleable Castings Co., Chicago. Co-chairman—F. Czapski, Chicago Malleable Castings Co., Chicago.
Graphitization in the Malleable Iron Industry—H. A. Schwartz, W. K. Bock and J. D. Hedberg, National Malleable & Steel Castings Co., Cleveland.
First Stage Graphitizing Rates for Electric Furnace Annealing of White Cast Iron—E. A. Loria, Carborundum Co., Niagara Falls, N. Y.

10 a.m. (E)—Pattern Session
Presiding—V. C. Reid, City Pattern Foundry & Machine Co., Detroit. Co-chairman—H. J. Flaaten, Midwest Pattern Co., Minneapolis.
Patterns for Shell Molding—R. Olson, Production Foundry & Pattern Co., Chicopee, Mass.
Pattern Equipment for Shell Molding—O. C. Bueg, Arrow Pattern & Engineering Co., Erie, Pa.

12 noon (A)—Brass and Bronze Roundtable Luncheon
Presiding—B. A. Miller, Baldwin-Lima-Hamilton Corp., Philadelphia.
A Brief Study of Fluid Flow in a Small Cylindrical Casting—motion picture, courtesy of Brass & Bronze Ingot Institute. Presented by J. C. Kura, Battelle Memorial Institute, Columbus, O.

12 noon (B)—Malleable Roundtable Luncheon
Presiding—R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis. Co-chairman—W. A. Kennedy, Grinnell Co., Inc., Providence, R. I.
How Far Should a Malleable Foundry Go in Sand Control—E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

2 p.m. (A)—Educational Session
Presiding—E. M. Strick, Erie Malleable Iron Co., Erie, Pa. Co-chairman—R. W. Schroeder, University of Illinois, Chicago.
The Foundry Industry and Formal Education—B. D. Claffey, Acme Aluminum Alloys Inc., Dayton, O., F. G. Sefing, International Nickel Co., Inc., New York, N. Y.

2 p.m. (B)—Heat Transfer Session
Presiding—E. C. Troy, foundry engineer, Palmyra, N. J. Co-chairman—F. T. McGuire, Deere & Co., Moline, Ill.

Solidification of Cylinders—Heat Transfer Research Progress Report—V. Paschkis, Columbia University, New York.

Solidification at Corner and Core Positions—F. A. Brandt, H. F. Bishop and W. S. Pellini, Naval Research Laboratory, Washington.

2 p.m. (C)—Light Metals Session

Presiding—J. H. Jackson, Battelle Memorial Institute, Columbus, O. Co-chairman—H. Rosenthal, Frankford Arsenal, Philadelphia.

A Technique for Casting Titanium—O. W. Simmons and H. R. McCurdy, Frankford Arsenal, Philadelphia.

Mechanical Properties of Cast Titanium-Carbon Alloys—O. W. Simmons and R. E. Edelman, Frankford Arsenal, Philadelphia.

2 p.m. (D)—Sand Session

Presiding—F. Carl, Fabricast Div., General Motors Corp., Bedford, Ind. Co-chairman—G. P. Phillips, International Harvester Co., Chicago.

Resins and Sands for Shell Molding—M. F. Drumm, Monsanto Chemical Co., Springfield, Mass.

Progress Report, Shell Molding Materials Testing—G. A. Conger, Cambria Foundry & Engineering Div., Stevens Mfg. Co., Ebensburg, Pa.

4 p.m. (A)—Light Metals Session

Presiding—W. A. Dean, Aluminum Co. of America, Cleveland. Co-chairman—R. A. Lubker, Armour Research Foundation, Chicago.

Evaluation of Mold Materials for Titanium Castings—R. M. Lang, J. G. Kura and J. H. Jackson, Battelle Memorial Institute, Columbus, O.

Preliminary Survey of Some Metallurgical Bases for a Titanium Castings Industry—S. V. Arnold, Watertown Arsenal, Watertown, N. Y., R. F. Malone, H. T. Clark and W. L. Findlay, Rem-Cru Titanium, Inc., Midland, Pa.

4 p.m. (B)—Pattern Session

Presiding—E. T. Kindt, Kindt-Collins Co., Cleveland. Co-chairman—J. W. Costello, American Hoist & Derrick Co., St. Paul.

What Research Offers in a Pattern Coating—C. J. Berg, Sherwin-Williams Co., Chicago.

4 p.m. (C)—Safety, Hygiene and Air Pollution Session

Presiding—F. A. Patty, General Motors Corp., Detroit. Co-chairman—J. M. Kane, American Air Filter Co., Louisville.

What Are Future Air Pollution Prospects for the Foundry Industry?—J. M. Kane, American Air Filter Co., Louisville.

Know Your Problem for Your Community—R. T. Greibling, Air Pollution Control Assn., Pittsburgh.

Air Pollution Control Equipment Available for the Foundry Industry—R. T. Pring, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

6:30 p.m.—Canadian Dinner, Morrison Hotel

Presiding—J. J. McFadyen, Galt Malleable Iron Co., Galt, Ont.

7 p.m.—Educational Dinner

Presiding—Collins L. Carter, Albion Malleable Iron Co., Albion, Mich.

A Chapter Educational Activity Program—H. E. Gravlin Jr., Ford Motor Co., Dearborn, Mich.

8 p.m. (A)—Brass and Bronze Shop Course

Presiding—R. J. Keeley, Ajax Metal Div., H. Kramer & Co., Philadelphia. Co-chairman—H. M. St. John, Crane Co., Chicago.

Gas and Oil Fired Furnaces—J. L. Stroman, Stroman Furnace & Engineering Div., the Petersen Oven Co., Franklin Park, Ill.

Furnace Practices—M. G. Dietl, Schaible Foundry & Brass Co., Cincinnati.

8 p.m. (B)—Gray Iron Shop Course

Presiding—H. H. Wilder, Vanadium Corp. of America, Detroit. Co-chairman—E. J. Burke, Hanna Furnace Corp., Buffalo.

Foundry Calculations and Essential Records—K. H. Priestley, Vassar Electroloy Products, Inc., Vassar, Mich.

8 p.m. (C)—Sand Shop Course

Presiding—H. Brown, Solar Aircraft Co., Des Moines, Iowa. Co-chairman—R. H. Olmsted, Whitehead Bros. Co., Conneaut, Ohio.

Evaluation of Molding Processes—Green Sand Molding: C. E. Maddick, Massey-Harris Ltd., Brantford, Ont. Permanent Mold or Die Casting: W. B. Scott, American Brake Shoe Co., Meadville, Pa. Dry Sand Molding: G. W. Anselman, Beloit Foundry Co., So. Beloit, Ill. Shell Molding: J. B. Stazinski, General Electric Co., Lynn, Mass. Core Sand Molding: G. P. Antonic, Motor Castings Co., Milwaukee.

WEDNESDAY, MAY 6

8:30 a.m.—Registration opens

10 a.m. (A)—Gray Iron Session

Presiding—J. S. Vanick, International Nickel Co. Inc., New York. Co-chairman—F. J. Dost, Sterling Foundry Co., Wellington, O.

Risering of Gray Iron Castings—Progress Report on Gray Iron Research—W. A. Schmidt and H. F. Taylor, Massachusetts Institute of Technology, Cambridge.

Efficient Methods of Production of Machine Tool Castings—Official exchange paper from Institute of British Foundrymen—G. W. Nicholls, Modern Foundries Ltd., Halifax, England.

10 a.m. (B)—Safety, Hygiene and Air Pollution Session

Presiding—J. G. Liskow, American Air Filter Co., Louisville. Co-chairman—W. W. Dodge, Caterpillar Tractor Co., Peoria.

Progress Report—AFS Safety, Hygiene and Air Pollution Program—J. R. Allan, International Harvester Co., Chicago.

Noise in the Foundry—H. T. Walworth, Lumbermen's Mutual Casualty Co., Chicago.

10 a.m. (C)—Symposium on Sand Reclamation

Presiding—J. A. Rassenfoss, American Steel Foundries, E. Chicago, Ind. Co-chairman—R. H. Jacoby, the Key Co., East St. Louis, Ill.

Reclamation of Sand by Pneumatic Dry Scrubbing—H. W. Meyer, General Steel Castings Corp., Granite City, Ill.

Development of Foundry Sand Reclamation—C. E. Wenninger, National Engineering Co., Chicago.

Dry Reclamation of Molding Sand for Steel Castings—J. A. Cannon, Duncan Foundry & Machine Works Inc., Alton, Ill.

Acme

12 noon—Pattern Roundtable Luncheon
Presiding—A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee. *Pattern Problems—Questions and Answers*

2 p.m. (A)—Symposium on Sand Reclamation
Presiding—T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va. Co-chairman—G. M. Etherington, American Brake Shoe Co., Mahwah, N. J.
A Wet Method of Sand Reclamation—R. H. Shurmer and P. C. Will, Hydro-Blast Corp., Chicago.
Sand Reclamation in a Steel Foundry—H. H. Johnson, R. Y. McCleery and G. A. Fisher, National Malleable and Steel Castings Co., Sharon, Pa.
Sand Reclamation with the Combination System—G. H. Curtis, Nichols Engineering & Research Corp., New York.

2 p.m. (A)—Gray Iron Session
Presiding—H. A. Deane, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Co-chairman—G. L. Richter, Farrel-Birmingham Co., Ansonia, Conn.
Dephosphorization of Iron—Basic Cupola Operation—J. E. Bolt, Lt. USNR, Bureau of Ships, Washington.
Acid Cupola Slags and Some Relationships with Melting Conditions—S. F. Carter and Ralph Carlson, American Cast Iron Pipe Co., Birmingham.

2 p.m. (B)—Refractories Session
Presiding—C. H. Wyman, Burnside Steel Foundry Co., Chicago. Co-chairman—R. A. Witschey, A. P. Green Fire Brick Co., Chicago.
Insulating an Electric Furnace Roof—C. C. Spencer, Electric Steel Castings Co., Indianapolis.
Correlation of Air Furnace Bottom Temperature to Refractory and Operating Practice in a Cupola-Air Furnace Duplex System—F. W. Jacobs and J. S. Lawrence, Jr., Texas Foundries Inc., Lufkin, Tex.
Refractories for Indirect Arc Electric Furnaces for Nonferrous Melting—M. G. Dietl, Schaible Foundry & Brass Co., Cincinnati.

2 p.m. (C)—Safety, Hygiene and Air Pollution Session
Presiding—J. G. Liskow, American Air Filter Co., Louisville. Co-chairman—W. W. Dodge, Caterpillar Tractor Co., Peoria, Ill.
Trends of Dust Control—Past, Present and Future—K. J. Caplan, consultant, St. Louis; K. M. Smith, Caterpillar Tractor Co., Peoria, Ill.; A. G. Granath, National Engineering Co., Chicago.

4 p.m. (D)—Timestudy and Methods Session
Presiding—Dean Van Order, Burnside Steel Foundry Co., Chicago. Co-chairman—J. J. Farkas, Cincinnati Milling Machine Co., Cincinnati.
Wage Incentive for Cost and Production Control for Indirect Operators—C. J. Pruet, McWane Cast Iron Pipe Co., Birmingham.

5 p.m.—Registration closes

7 p.m.—Annual Banquet—Hotel Morrison
Presiding—I. R. Wagner, president, AFS. Presentation of AFS gold medal awards and honorary life memberships
Speaker: Dr. George S. Benson, president, Harding College, Searcy, Ark.—*Education for Free Enterprise.*

THURSDAY, MAY 7

9 a.m.—Registration opens.

10 a.m.—AFS Annual Business Meeting
Presiding—AFS National President I. R. Wagner. President's annual address. Apprentice contest awards. Election of officers and directors.

11 a.m.—Charles Edgar Hoyt Annual Lecture
Outstanding Opportunities for the Foundry Industry—James H. Smith, general manager, Central Foundry Div., General Motors Corp., Saginaw, Mich.

12 noon (A)—Gray Iron Roundtable Luncheon
Presiding—W. W. Levi, Lynchburg Foundry Co., Radford, Va.
Casting Defects—W. A. Hambley, Chas. A. Krause Milling Co., Birmingham, Mich.

12 noon (B)—Steel Roundtable Luncheon
Presiding—J. B. Caine, foundry consultant, Cincinnati. Co-chairman—V. E. Zang, Unitcast Corp., Toledo, O.
Hot Tear Investigation—AFS Steel Research Progress Report—C. H. Wyman, Burnside Steel Foundry Co., Chicago. *Effect of Casting Defects on Service Performance. What Are Your Troubles? Let's Discuss Them.*

2 p.m. (A)—Plant and Plant Equipment Session
Presiding—James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Co-chairman—H. W. Johnson, Wells Mfg. Co., Skokie, Ill.
Core Making Machines—L. B. Koenig, J. I. Case Co., Racine, Wis.
Mechanization in Core Making—H. C. Weimer, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago. (Motion picture).

2 p.m. (B)—Foundry Cost Session
Presiding—R. L. Lee, Grede Foundries Inc., Milwaukee. Co-chairman—C. E. Westover, Westover Engineers, Milwaukee.
Use of Standards in Controlling Costs—William Busby, Texas Foundries Inc., Lufkin, Tex.
Are Your Costs Reliable—R. T. Lewis, Keen Foundry Co., Griffith, Ind.
A Cost System for Small Jobbing Foundries—R. W. McDonnell, Letson & Burpee Ltd., Vancouver, B. C.

2 p.m. (C)—Refractories Session
Presiding—W. R. Jaeschke, Whiting Corp., Harvey, Ill. Co-chairman—R. P. Schauss, Werner G. Smith Inc., Chicago.
Gun-Placed Silica Cupola Linings—T. E. Barlow and P. D. Humont, International Minerals & Chemical Corp., Chicago.
Effects of Operating Practice on Refractory Life in the Periodic Air Furnace—C. F. Semrau, Illinois Malleable Iron Co., Chicago.
Carbon as a Refractory—J. V. Nolan and T. J. Wilde, National Carbon Co., New York.

2 p.m. (D)—Sand Session
Presiding—J. B. Caine, foundry consultant, Cincinnati. Co-chairman—W. S. Pellini, Naval Research Laboratory, Washington.
Ramming of Molding Sands—H. W. Dietert and A. L. Graham, Harry W. Dietert Co., Detroit.

Casting Surface Finish and Flowability of Sand—H. H. Fairfield and James McConachie, William Kennedy & Sons Ltd., Owen Sound, Ont.
Report of Flowability Committee—J. B. Caine, foundry consultant, Cincinnati.

4 p.m. (A)—Gray Iron Session

Presiding—D. E. Krause, Gray Iron Research Institute, Columbus, O. Co-chairman—F. T. McGuire, Deere & Co., Moline, Ill.
Trends for the Relation of Chill Test Depth and Carbon Equivalent of Gray Cast Irons—E. A. Loria, Carborundum Co., Niagara Falls, N. Y.
Hardening Characteristics of Induction Heated Ductile Iron—E. P. Rowady, General Electric Co., Schenectady, W. J. Murphy and J. F. Libsch, Lehigh University, Bethlehem, Pa.

4 p.m. (B)—Safety, Hygiene and Air Pollution Session

Presiding—J. W. Young, International Harvester Co., Chicago. Co-chairman—M. F. Biancardi, Allis-Chalmers Mfg. Co., Milwaukee.
Positive Benefits of a Safety Program—F. W. Shipley, Caterpillar Tractor Co., Peoria.
Question and Answer Panel—AFS Safety Committee.

4 p.m. (C)—Steel Session

Presiding—C. B. Jenni, General Steel Castings Co., Eddystone, Pa. Co-chairman—J. R. Goldsmith, Crane Co., Chicago.
The Influence of Molding Materials on the Incidence of Hot Tearing—J. M. Middleton, British Steel Castings Research Association, Sheffield, England.
Progress Made in Fluidity Testing of Molten Metal During the Last Ten Years—A. I. Krynitsky, (retired), National Bureau of Standards, Washington—To be presented by J. H. Schaum, National Bureau of Standards, Washington.

4 p.m. (D)—Timestudy and Methods Session

Presiding—J. A. Westover, Westover Engineers, Milwaukee. Co-chairman—H. R. Williams, Williams Management Engineering, Milwaukee.
Developing Standard Data Tables for Core Finishing—L. L. Martin, Sterling Foundry Co., Wellington, Ohio.
Conveyor Molding Standards—E. C. Reid, Ford Motor Co. of Canada, Ltd., Windsor, Ont.

5 p.m.—Registration closes

7 p.m.—AFS Alumni Dinner

Presiding—Walter L. Seelbach, Superior Foundry Inc., Cleveland. *Israel and Its Industry*—H. Bornstein, Deere & Co., Moline, Ill.

8 p.m. (A)—Gray Iron Shop Course

Presiding—W. W. Levi, Lynchburg Foundry Co., Radford, Va. Co-chairman—E. J. Burke, Hanna Furnace Corp., Buffalo.
Practical Aspects of Carbon Control in the Cupola—A. J. Dublo, Sterling Foundry Co., Wellington, O.

8 p.m. (B)—Sand Shop Course

Presiding—R. H. Jacoby, the Key Co., East St. Louis, Ill. Co-chairman—F. E. Kurtz, Electric Steel Castings Co., Indianapolis.
Hot Properties of Molding Sands and Their Relation to Casting Defects. Steel: H. W. Meyer, General Steel Castings Corp., Granite City, Ill. Malleable: B. C. Yearley, National Malleable & Steel Castings Co., Cicero, Ill.

FRIDAY, MAY 8

9 a.m.—Registration opens

10 a.m. (A)—Gray Iron Session

Presiding—G. A. Timmons, Climax Molybdenum Co., Detroit. Co-chairman—R. A. Clark, Electro Metallurgical Div., Union Carbide & Carbon Co., Detroit.
The Fundamentals of Heat Treatment of Gray Cast Iron—J. E. LaBelle, Detroit Diesel Engine Div., GMC, Detroit.
Annealing Iron Castings for Machinability—A. W. Demmler, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.
Through Hardening of Gray Iron—A. A. Armstrong, Thompson Products Inc., Cleveland.
Flame Hardening Cast Iron—M. R. Scott, Detroit Flame Hardening Co., Detroit.
Stress Relieving Gray Iron—J. H. Schaum, National Bureau of Standards, Washington.

10 a.m. (B)—Sand Session

Presiding—E. C. Zirzow, Werner G. Smith Inc., Cleveland. Co-chairman—H. W. Meyer, General Steel Castings Corp., Granite City, Ill.
Induced Flow Process of Baking Oil-Bonded Cores—C. T. Marek, Purdue University, Lafayette, Ind., and R. J. Wimmert, Air Reduction Corp., Union, N. J.
Veining Tendencies of Cores—Committee 8-J Report—H. H. Fairfield, William Kennedy & Sons, Ltd., Owen Sound, Ont.
Sand Research—Progress Report—R. G. Thorpe, Cornell University, Ithaca, N. Y.

10 a.m. (C)—Steel Session

Presiding—A. H. Suckow, Symington-Gould Corp., Depew, N. Y. Co-chairman—K. Fritz, Bucyrus-Erie Co., Milwaukee.
Feeding Range of Joined Sections—E. T. Myskowski, H. F. Bishop and W. S. Pellini, Naval Research Laboratory, Washington.
Fundamentals of Riser Behavior—C. M. Adams and H. F. Taylor, Massachusetts Institute of Technology.

2 p.m. (A)—Gray Iron Session

Presiding—H. L. Ullrich, Sacks-Barlow Foundries, Newark, N. J. Co-chairman—G. P. Phillips, International Harvester Co., Chicago.
Effect of Magnesium on Eutectic Modification and Graphitization of Certain Fe-C Alloys—H. W. Weart and R. W. Heine, University of Wisconsin, Madison.
Prediction of Mechanical Properties from Chemical Composition for Fully-Annealed Ductile Cast Iron—C. C. Reynolds, C. M. Adams, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge.

2 p.m. (B)—Steel Session

Presiding—A. W. Demmler, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Co-chairman—J. Neff, American Steel Foundries, E. Chicago, Ind.
Performance of Cast and Rolled Steels in Relation to the Problem of Brittle Fracture—W. S. Pellini, F. A. Brandt and E. E. Layne, Naval Research Laboratory, Washington.
Engineering Aspects of Centrifugal Casting—J. F. Wallace, Watertown Arsenal, Watertown, Mass.

4 p.m.—57th annual meeting officially closes

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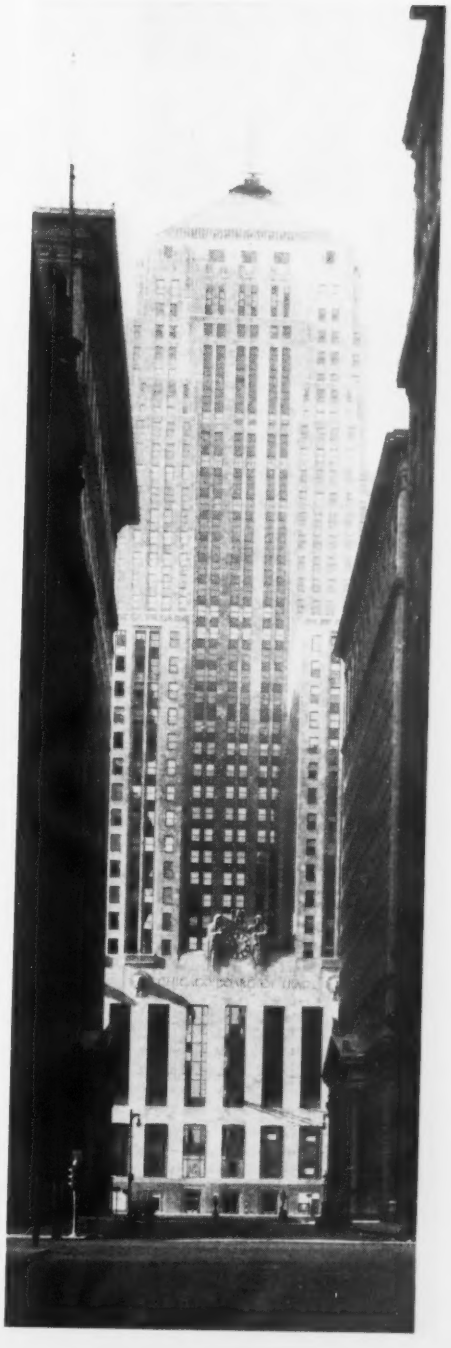

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To Honor Six With

AFS Awards

DANIEL E. KRAUSE—*John H. Whiting Medalist*

Mr. Krause, chosen as recipient of the John H. Whiting gold medal "for outstanding contributions to the society and the foundry industry in the field of ferrous metallurgy and research," has been executive director of the Gray Iron Research Institute, Columbus, O., for the last six years. In that capacity he has been in charge of its research projects and supervised its plant service and publications. Mr. Krause is a graduate of the University of Wisconsin and was associated with Battelle Memorial Institute, Columbus, O., for 15 years prior to accepting his present position. He served as a member of the AFS Committee on Chill Test and has been both secretary and chairman of the Central Ohio Chapter.

WILLIAM J. GREDE—*William H. McFadden Medalist*

Mr. Grede, as recipient of the William H. McFadden gold medal, is honored for his "outstanding public service bringing great credit upon and broad recognition for the entire foundry industry." Mr. Grede, president of Grede Foundries Inc., Milwaukee, entered the industry in 1917 and assumed management responsibilities with the purchase of Liberty Foundry in Wauwatosa, Wis., in 1920. Under his direction the organization has grown to include six plants. Mr. Grede has been a leader in the industrial management field and has given unselfishly of his time and effort to business and civic organizations. He recently completed terms as national president of the YMCA and as president of the National Association of Manufacturers.

WILLIAM ROMANOFF—*Joseph S. Seaman Medalist*

Mr. Romanoff is being honored with the award of the Joseph S. Seaman gold medal "for exceptional contributions to the society and its Brass and Bronze Division over many years." Mr. Romanoff, vice president and technical superintendent of H. Kramer & Co., Chicago, is a graduate of the University of Michigan and has been closely identified with the foundry industry since 1920. He first served as metallurgist with Ohio Brass Co., Mansfield, O., and has been associated with H. Kramer & Co. since 1926. Mr. Romanoff is a past chairman of the AFS Brass and Bronze Division, and has contributed numerous articles on nonferrous metals to the technical press.

Four gold medals and two honorary life memberships in the American Foundrymen's Society will be awarded during the Chicago convention. The presentations will be made at the annual banquet Wednesday evening, May 6, at the Terrace Casino, Hotel Morrison

JAMES H. SMITH—*Peter L. Simpson Medalist*

Mr. Smith has been designated Peter L. Simpson medalist "for outstanding contributions to the application of engineering principles in foundry practice, and as the 1953 Charles Edgar Hoyt annual lecturer." He has been general manager of Central Foundry Division, General Motors Corp., Saginaw, Mich., since 1946. Other GMC divisions he has been associated with during his career include Buick Motor Division, Saginaw Malleable Iron Division, and for a time he was assistant to the vice president in charge of the Accessory Divisions Group. Mr. Smith has been a member of the AFS board of directors, a trustee of the Foundry Educational Foundation and president of the Malleable Founders' Society.

GEORGE J. BARKER—*Honorary Life Member*

Mr. Barker, professor of metallurgical engineering at the University of Wisconsin, Madison, Wis., will receive an honorary life membership in recognition of his "outstanding contributions to the society and the castings industry in the education of young engineers for greater appreciation of the industry, the casting process and cast products as engineering materials." Professor Barker, a graduate of the university, has been a member of its faculty since 1921. Under his chairmanship, the Department of Mining and Metallurgy has installed a new foundry laboratory, enlarged the foundry curriculum and increased facilities for foundry research. Professor Barker is completing two years as chairman of the society's Educational Division.

I. RICHARDS WAGNER—*Honorary Life Member*

Mr. Wagner, in accordance with the custom of the society, will be awarded an honorary life membership as retiring president of the society. Mr. Wagner is director and former president of Electric Steel Castings Co., Indianapolis, and has been associated with that organization since 1920. His early metallurgical experience was gained with Alan Wood Steel Co., Ivy Rock, Pa., and with Midvale Steel Co., Philadelphia. While with the U.S. Army Ordnance Department during World War I he established checking laboratories at various steel plants. Mr. Wagner is a past chairman of the Central Indiana Chapter of the AFS, and he also is a past president of the National Foundry Association.

QUESTION

Method of anchoring chaplets for lamp posts . . . . .

Chromate finishing . . . . . Loss of zinc is high

Iron kettle founding . . . . . Gating information

Anchoring Lamp Post Chaplets

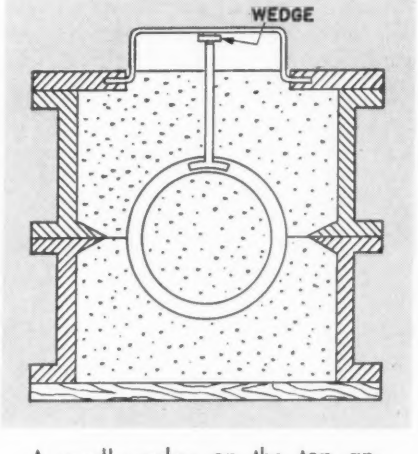
QUESTION Some time ago FOUNDRY presented an article on the method and equipment employed in a midwest foundry for molding lamp post castings. We do not recollect any mention of how the chaplets were anchored in the cope.

ANSWER Many methods are available for securing cope chaplets. Method adopted in any given instance usually is dictated by local conditions. In the shop to which you refer the molds were made in heavy cast iron flasks without bars in either cope or drag. The flask joints were planed and a wide sand strip approaching to within 1½ in. of the lamp post pattern held the sand in place on the joint face of each half mold.

A substantial wood bottom board supported the sand at the back when the drag was rolled over. A heavy cast iron plate clamped on the cope before it was lifted from the ramming table served the same purpose on the cope. Obviously, it was impossible to bed this plate down with the degree of accuracy required to engage the ends of the chaplet stems, cut to a uniform length. To attempt to cut and fit each chaplet individually would mean a great deal of time and effort. The daily output was 100 castings and each casting required four chaplets in the cope.

Method adopted for holding the chaplets is shown in the accompanying illustration. Four rectangular openings, 6 x 8 in. and spaced about 2 ft apart on the center line of the cope covering plate, provided a wide range of positions for the chaplets on various lengths of castings. A piece of steel band, ¼ x 2 in., bent at a right angle at each end was anchored firmly by the toes over each opening in the plate. In shop parlance the toes on the steel bands were "cast in," by setting them in the open sand mold for the covering plate and pouring the metal around them.

Chaplet stems cut to a uniform length project through the openings in the plate and approach to within ¼, ⅜ or ½-in. distance of the steel band. The molder slips a pair of thin wood wedges from opposite sides between the top of the chaplet stem and the under or bottom side of the steel strap. This anchors the chaplet accurately and safely in place.



A small wedge on the top anchors the core quickly and safely

Chromate Coating Application

QUESTION Can you give us any information on a metal finishing process called chromate or dichromate finish?

ANSWER You did not state whether the chromate treatment was for aluminum or magnesium alloy castings. One for aluminum alloys is to immerse the product in a 5 to 10 per cent chromic acid solution at 140 to 150° F for about 5 minutes; rinse in cold water and dry.

For magnesium alloys either of the following baths may be used: Add 1.5 lb sodium dichromate and 1.5 pints nitric acid (conc.) to one gallon of water or 1 lb chromium trioxide and 0.9-pint nitric acid to one gallon of water. Parts are left in about one minute, rinsed in nearly boiling water, and dried with an air blast.

Zinc Loss Appears Excessive

QUESTION We are running large volumes of yellow brass plumbing items, many of which have thin sections. Our chief problem is metal losses in melting and we are hoping you can help us to modify them. We use gas and oil-fired crucible furnaces for Nos. 70 and 90 pots, and one No. 125 tilting furnace. We presently are adding from 5 to 10 per cent zinc to each pot. Specifically we would like to know: When is the proper time to add the zinc to the pot? Can we use our No. 125 tilting furnace and hold the metal while we pour off in the smaller crucibles, and if so what temperature should be employed? We are adding a small piece of aluminum just before pouring. Is this good practice?

ANSWER One of the first suggestions to keep your zinc losses at a minimum is to make a pouring temperature survey of your different types of castings, and determine the lowest which regularly will produce castings free from cold shuts. Then determine the temperature drop between furnace side and pouring station, including skimming. Addition of those two figures will give the temperature at which the brass should be removed from the furnace and poured. For example, you may find that a pouring temperature of 2050° F will be satisfactory, and that the temperature drop between furnace and mold side is 50°. Hence, when the metal in the fur-

ANSWERS

nace has reached 2100° the pot should be pulled, skimmed, and poured.

Usually the zinc loss on yellow brass is from 1½ to 2 per cent using ingot metal. With light scrap as the major part of the charge, the loss would be higher, but your reference to 5 to 10 per cent seems excessive. Possibly you are adding more zinc than actually is lost. The only way to actually determine the loss is to analyze the raw material as charged into the pot, and again after it is melted. Since zinc has a melting point of 787° F it will go into solution rapidly in molten metal at 2100° F, and with the comparatively small amount to be added, the addition is made just a few minutes before the pot is pulled from the furnace. Metal, of course, should be stirred, although not excessively, to insure solution.

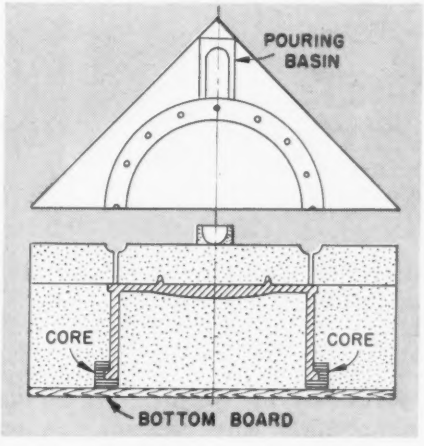
With high-zinc alloys such as the yellow brasses, use of phosphor-copper is not necessary, and some believe that its application promotes volatilization of zinc. While addition of a small amount of aluminum to yellow brass aids in suppressing zinc fumes and improves the flow characteristics of the alloy, its use in castings which have to withstand pressure generally is considered hazardous. The aluminum forms an oxide skin on the surface of the molten alloy, and unless the gating is such that the skin or envelope surrounding the metal stream remains unbroken, inclusions are formed and carried into the casting cavity.

So far as we can see there is no reason why brass melted in the No. 125 unit cannot be poured off into smaller crucibles provided they are almost at a white heat when used. As indicated earlier, the holding temperature of the alloy should be just high enough above the pouring temperature to permit skimming and carrying the metal to the mold side.

Producing Cast Iron Kettles

QUESTION We operate a foundry in South America, and are trying to produce gray iron kettles of the design shown in the accompanying sketch. These have capacities from 60 to 100 gallons, and must withstand 8 psi vapor pressure. What is the most practical way to mold them and the best procedure of gating and risering? Also what properties should the molding sand have?

ANSWER Most logical method of molding the gray iron kettles you mention is with the bottom up,



Core at bottom and top gating simplifies kettle production

using a dry-sand ring core to form the flange at the bottom of the mold. Production of the ring core is facilitated by making it in several pieces, such as a quadrant or octant, rather than as the full circle. This also permits easier handling and setting up in the mold.

Top gating through a number of small pencil or pop gates is suggested. We believe that use of 16 gates 5/16-in. in diam, equidistantly spaced circumferentially and midway between the inner and outer peripheries of the casting cavity, would be desirable. As indicated in the accompanying sketch, the pencil gates lead from a pouring ring which, in turn, is fed from two basins located on opposite corners.

Molding sand for this work should be reasonably permeable—90 to 100—with a green compressive strength around 10 psi. It should be worked on the dry side, since the lower the moisture content, within reason, the smaller the generation of steam on contact of molten metal and sand.

Wants Information on Gating

QUESTION Most of our matchplates are about 12 x 16 in. with from six to thirty patterns on a plate; castings being in red brass and occasionally Cu-Zn-Si alloy. We have been using runner bars from ⅝ x ¾-in. to ¾ x ¾-in. (trapezoidal) as casting size increased. It has been suggested that these bars are larger than necessary, thus increasing melting costs. Is there a standard rule for computing gating systems? Also in gating brass castings of unequal metal sections the theory has been advanced that the ingate should be at the thinner portion of the casting and away from the heavier section. Is this the correct procedure?

ANSWER At the present time considerable study is being made of gating procedures for castings, but as yet no standards have been developed. Some of the phases indicated thus far are that the cross-sectional area of the runner should be equal to or slightly larger than the total cross-sectional area of all the gates entering the casting cavities, and the cross-sectional area of the runner should be two to three times that of the base of the down sprue. Hence, in designing a gating system one should start with the gates into the cavities, trying to keep them as short as possible to create a hot spot between runner and casting which prevents freezing off.

It also has been found that formation of a pool or enlargement

at the base of the sprue aids in reducing turbulence and produces cleaner and sounder castings. Similarly the extension of the runner beyond the last gate performs a similar function as well as acting as a dirt catcher.

As far as gating into the thin section is concerned, we believe that the general consensus is that it should be used only in special cases—that is, where the heavy section is located in such a position that it cannot be fed by risers. Theory is that the metal is cooled during its travel through the thin sections, and at the same time the mold surfaces in those sections are raised to a high temperature. From that combination of effects the cooling rates of the two types of sections are brought closer together. Usually to provide better insurance that such condition will ensue, chills are applied to the heavier section as well. However, where possible it always is advisable to place the riser close to the casting, and gate into it.

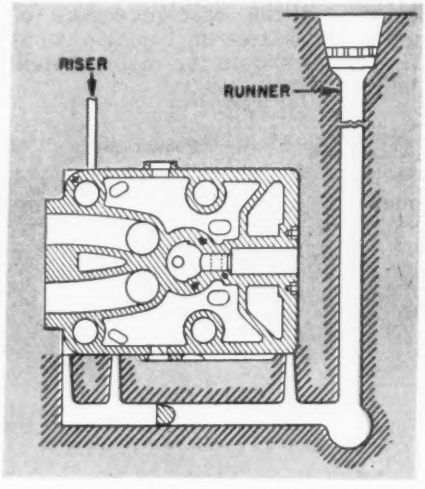
Has Trouble With Diesel Head

QUESTION We are making small diesel cylinder heads in our foundry in India, and are having trouble with metal penetrating the cores, as well as with gas pockets as indicated on the accompanying drawing, which also shows the gating method. Sand used for the cores is a red sand containing 91 per cent SiO_2, 4 per cent Fe_2O_3, 3 per cent Al_2O_3, alkalies not estimated. Sand passes through a 30 mesh sieve and remains on 70 mesh, with 40 per cent retained on 40 mesh.

Core mixture is 95½ lb sand, 2 lb molasses and 2½ lb linseed oil. Cores are blown with 120 psi. We use the same core mix for nonferrous pump impellers and have penetration there. Molding sand has a permeability of 80 to 90, green strength 8 to 9 psi, and molds are rammed to 50 hardness. Metal is poured at 1350 to 1400° C (2462 to 2552° F). Iron contains 2.9 to 3.0 per cent TC, 1.6 to 1.7 per cent Si, 1.5 to 2.0 per cent Ni, 0.6 to 0.8 per cent Cr, and 0.9 to 1.0 per cent Mn. If penetration and gas pockets can be eliminated by a core wash, can you give us the composition?

ANSWER Your difficulty with penetration is due to the coarseness of the sand and its poor distribution of grain size. It practically is a two-screen type without any fine grains to fill in the voids between the coarse grains, and we would expect an extremely rough surface. Possibly some improvement could be made by addition of finer sands in the 100 and 140 grain size, but that would require considerable experimenting to obtain the best proportions.

Possibly applying a refractory coating of some kind might fill in the pores between the sand grains and hold penetration to a minimum. You might try the following mixture developed by the Naval Research Laboratory: Silica flour 64 parts, bentonite 1.5 parts, dextrine 3 parts, sodium benzoate (preservative) 0.2 parts, and water 31.3 parts—all by weight. Numerous proprietary core coatings are on the market which give good service, but we gather you are not close to an available source for such materials.



Holes in diesel head casting may be the result of shrinkage

The gas holes you mention probably result from the cores, and might be due to lack of venting, excess organic materials (binder) in the core, or improper baking. Perhaps the cores are vented, but connecting passages to the outside of the mold are not provided. In complicated cores entirely surrounded by metal it always is advisable to use the least possible binder which will serve, since it generates gases. Hence, we suggest that you try reducing the amount of binder used by making up small experimental batches. Also we suggest use of cereal instead of molasses.

However, we wonder if the holes you mention are due to shrinkage rather than gas, more particularly with reference to the heavy section in the central part. It appears that a change in gating, so that metal would be fed into that section, might eliminate the trouble.

Making Cupola Pressure Gage

QUESTION Can you send us a simple sketch for an air volume measuring instrument for the windbox inlet of our cupola. Our foundry is in Brazil, and we have difficulty in obtaining such devices.

ANSWER Several methods of measuring the volume of air delivered to the cupola are used, including the orifice plate, pitot tube and venturi tube. Of these probably the orifice plate would be the easiest to construct, but you would have to have a number of tables as well as other details to perform the work. Some of the information is available in the *Handbook of Cupola Operation.* Full discussion of this and other methods is presented in *Principles and Practice of Flow Meter Engineering* by L. K. Spink.

Orifice plate method consists of inserting a flat plate with a smaller hole than the pipe diameter in the line. Smaller hole in the plate increases the flow velocity at this point, creating a differential pressure across the plate. The latter is related to the flow of air in the pipe, and serves as a measure of it.

If you have in mind a pressure gage rather than a volume meter, the problem is simpler. Make a manometer or U-tube by bending a piece of small internal diameter glass tubing in the form of the letter U about 5 in. long and 1 in. across. Pour mercury in the tube until it strikes a level about 2½ in. from the bottom. One leg of the U-tube is connected to the windbox or blast pipe by rubber tubing or other means, and the other is left open to the atmosphere. For each ounce of pressure per square inch applied to the connected end of the tube, the levels of the mercury in the two legs will change 0.127-in. or slightly over ⅛-in.

A scale can be used on only one leg by setting zero at the mercury level when no pressure is applied.

(*Concluded on page* 166)

STOP DELIVERING PACKED SAND TO YOUR MOLDERS

Royer Model NYS-E aerating the contents of a 10½ cubic foot loader bucket in 10 seconds at the Central Specialty Co., Ypsilanti, Michigan. The approximate total volume handled is 450 tons per day.

In foundries with centralized sand conditioning systems, the sand delivered to the individual molding stations by means of front end loaders, etc., because of the method of handling is usually packed tight. For best molding results it must be aerated. And here is where the new Royer Model NYS-E, a portable aerator designed for loader feeding, fits into the sand preparation picture. Built specifically for this use, the 120 ton per hour capacity of this unit is sufficient to handle a 12 cubic foot load within the time required to empty the bucket and back away. The hopper is large enough to receive the entire 12 cubic feet of sand without spillage and has sides steep enough to insure unassisted material flow. The hopper throat has an adjustable gate to regulate the flow of the material.

Sand from the hopper is fed into the Royer where the "combing belt" action completely blends, mixes and aerates it, discharging a light, fluffy product ready for the molder's use.

The machine is sturdily constructed with heavy welded underframe and base. Compactly built, it can easily be moved from station to station; stationary model NYS-E (illustrated) by fork lift and portable model NYP-E on its own four-wheeled carriage.

Don't scrap the benefits gained through centralized sand control by delivering packed sand to your molders. Improved casting quality results from properly aerated molding sand. Write for more information on the Royer NYS-E and other Royer cost-cutting foundry equipment.

Export Department, 306 W. Washington Blvd.
Chicago 6, Ill., U.S.A. Cable: ASMAN

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 164)
and using intervals of 1/16-in. for each ounce of pressure per square in. To prevent dust and dirt from contaminating the mercury it is advisable to insert some filtering means between the windbox or blast pipe and the U-tube. Loosely packed steel wool, glass wool or cotton batting should serve. This filter should be changed from time to time to prevent clogging and consequent high resistance to air passage.

Cast Iron to Resist Abrasion

QUESTION We are making castings for centrifugal pumps and parts used in pumping sand and gravel from pits, and, as you know, these require a metal that is machinable but tough enough to withstand the abrasion. We are using 35 to 40 per cent steel scrap to get a metal with 1.5 to 1.8 per cent Si. While we are not getting any complaints we will appreciate a suggested mixture. In your opinion would it help machinability and wearability if the castings were stored outside for a period of time, and if so how long?

ANSWER For exceedingly long life under highly abrasive conditions an alloy cast iron containing 4 to 4.75 per cent Ni and 1.40 to 3.50 per cent Cr is claimed to have three to four times the life of the usual white iron used for such purposes. You will note that we mention white iron as being the usual material for resisting abrasion, and your reference to 1.5 to 1.8 per cent Si in your iron, as well as to machining would indicate it is not in that classification.

White iron, of course, is practically unmachinable, and perhaps that is why you use what you do. It might be pointed out that while you have not received any complaints on casting life as yet, it should be kept in mind that there always is the possibility of competition stepping in with a longer-lived product.

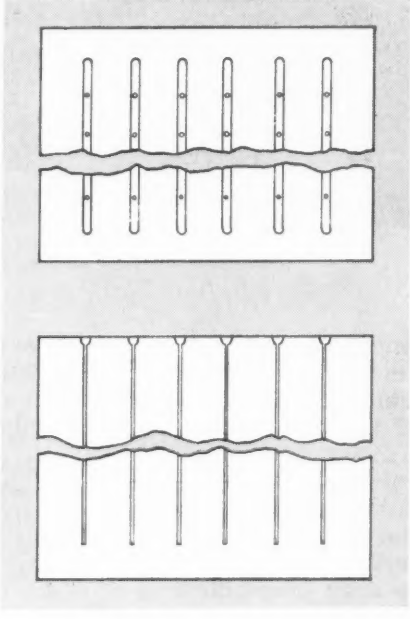
Storing castings for a period of time in the yard, commonly referred to as aging, was practiced years ago to relieve casting strains so that when they were machined they would retain dimensional stability, and that did occur to some degree. Today where such difficulty is encountered the castings are aged or stress-relieved by heating to about 1000° F and slowly cooled in the furnace. Storage aging or heat aging has no effect on wearing qualities. Heat aging might improve machining slightly.

Simplify Welding Rod Casting

QUESTION Several years ago FOUNDRY presented a description of a shop kink for making welding rods. The description was offered as an emergency measure when and if for any reason, no commercial rods were available. Can you supply a copy, a clipping or a reprint?

ANSWER Molds for special welding rods may be made as shown in the accompanying illustration — a freehand sketch not drawn to scale and deliberately exaggerated in the interest of clarity.

A deep drag is rammed full of sand and struck off level. Any desired number of channels across the face are formed with a gate cutter, six in the example shown. A ¼ or ⅜-in. vent wire is used to punch a number of holes to any desired depth below each of the gate channels. Iron to pour these rods is taken from a charge where the analysis corresponds closely to that of the casting to be repaired by welding.



Two views of simple green sand mold for welding rod castings

The metal is poured from a hand ladle (average capacity about 60 lb). About two teaspoonfuls of powdered 85 per cent ferrosilicon is placed in the bottom of the ladle before it is filled with iron direct from the cupola spout or from a mixing ladle. The metal must be as hot as possible to insure quick solution of the ferrosilicon, and still be able to pour the thin rods.

Has Trouble in Abrasive Face

QUESTION We are trying to make abrasive-faced aluminum alloy castings, and occasionally have trouble with the abrasive falling out. Some one told us that some kind of clay is mixed in the spray for the molds. We also were informed that in making bronze and aluminum tablets in French sand, the pattern is removed, and the mold face dusted with the sand. Then the pattern is put back, the cope placed in position, and then everything removed. It this the best procedure to follow?

ANSWER With reference to your inquiry on making abrasive faced castings, it might be pointed out that some skill and experience are required to obtain satisfactory results. Since you do not mention details on your practice, we cannot make any suggestions on improvement.

A number of adhesives are used to hold the abrasive in place, such as clay wash, molasses water, waterglass, sulphite liquor, etc. Abrasive should be screened on to produce an even, thin layer, and sometimes a second application of adhesive and abrasive are used. After application the mold face should be skin-dried to prevent boiling due to moisture. Metal should be good and hot when poured since success depends on metal penetrating between the abrasive grains, and a partial fusion of the grains.

The method you mention in relation to making tablets and plaques as well as certain other types of ornamental work is known as stamping back, but as far as we know only the pattern is replaced in the cavity. Previous to that replacement the face of the mold usually is dusted lightly with some dry material such as graphite, blacking, charcoal, flour, etc. with the idea of obtaining a better surface on the casting. The excess is blown off, and then to make sure that there are no loose particles on the mold face, the pattern is replaced carefully and lightly pressed or rapped down, and then removed.

REFRACTORIES— Melting... Cutting Out...?

RUNOUT TROUGHS

CINDER NOTCH LINERS

CINDER NOTCH PLUGS

MOLD PLUGS

BEDS AND TRAYS

SPLASH PLATES

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TRADE-MARK

"National" carbon blast furnace linings, of course. But HAVE YOU THOUGHT ABOUT CARBON for the other hot-spots where ordinary refractories conk out from high temperatures or slag-cutting? CARBON, the refractory, has no melting point and low affinity to molten metal and dross. In fact, even in *unfavorable* atmospheres, CARBON frequently outperforms other refractories on a length-of-life or cost-of-replacement basis.

Here are some of the places where "National" carbon and graphite can follow up their good work in the furnace...improve production, deflate maintenance cost, increase product quality and better the safety of equipment and personnel.

ON NEW APPLICATIONS OF CARBON, CONSULT NATIONAL CARBON'S ENGINEERS FOR PROPER GRADE AND DESIGN.

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Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

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Men of Industry

CHARLES T. SHEEHAN is the new executive secretary, National Foundry Association, Chicago, succeeding **Edward J. Walsh,** just made executive director, Foundry Educational Foundation, Cleveland. Since late 1951 Mr. Sheehan has been regional counsel and assistant to Mr. Walsh in development of NFA's program of activities.

• • •

Donald L. Mason has been appointed plant engineer, Superior Electrocast Foundry Co., South San Francisco, Calif., and will be responsible for plant operation improvements. In 1937 Mr. Mason was graduated from Oregon State College where, until 1942, he was instructor in foundry practice. Since then he has been in charge of foundry operations in the mechanical engineering department, Stanford University.

• • •

Alexander Gobus has been named head of the nondestructive testing department recently established by North American Philips Co., Mount Vernon, N. Y., to handle new research developments in the industrial x-ray field. Since 1943 Mr. Gobus has been vice president, chief metallurgist and director of nondestructive testing, Sam Tour & Co., New York.

• • •

Stanley F. Levy has been appointed metallurgist, the H. P. Deuscher Co., Hamilton, O., producer of gray iron castings. Mr. Levy was graduated from Case Institute of Technology and began his career as a chemist with Armco Steel Corp., Middletown, O. For the last 17 years he has been metallurgist, Black-Clawson Co., Hamilton, O., and in charge of its foundry operations in Middletown, O.

• • •

John E. Urquhart has been named president and a director, Woodward Iron Co., Woodward, Ala., succeeding **B. C. Colcord,** resigned. Mr. Urquhart was graduated from Yale University and until 1933 was associated with Semet-Solvay Co., New York. He then joined Woodward as general superintendent of blast furnace, coke oven, and railroad operations and later became general superintendent. He resigned in 1944. Two years later he helped organize Mill & Textile Supply Inc., Birmingham and has been retired since 1947.

• • •

John F. Ducey Jr. has been appointed vice president, **George E. Anne** assistant vice president, and **Daniel J. Wagner** district sales manager, Brake Shoe & Castings Division American Brake Shoe Co., New York. Mr. Ducey, located in the San Francisco office, became district sales manager in 1949 and assistant vice president two years later. Mr. Anne, in Philadelphia, has been a sales representative since 1925. Mr. Wagner, who has been a New York sales representative since 1947, will be located in the Chicago office.

• • •

Kenneth J. Humberstone and **George F. Franck** have been named vice presidents, American Tank & Fabricating Co., Cleveland. Mr. Humberstone is in charge of engineering, manufacturing and sales of foundry supplies and accessories made by the company. Mr. Franck, manager of the Elmwood Ave. plant, supervises steel warehouse sales, flame cutting and metallizing.

• • •

J. W. Struve president, Rich Mfg. Co. of California, Los Angeles, was recently elected president, Cast Iron Soil Pipe Institute, New York. **Frank Hamilton,** president, Anniston Soil Pipe Co., Anniston, Ala., was named vice president, and **Deems W. Hallman,** manager, Hajoca Corp., Lans-

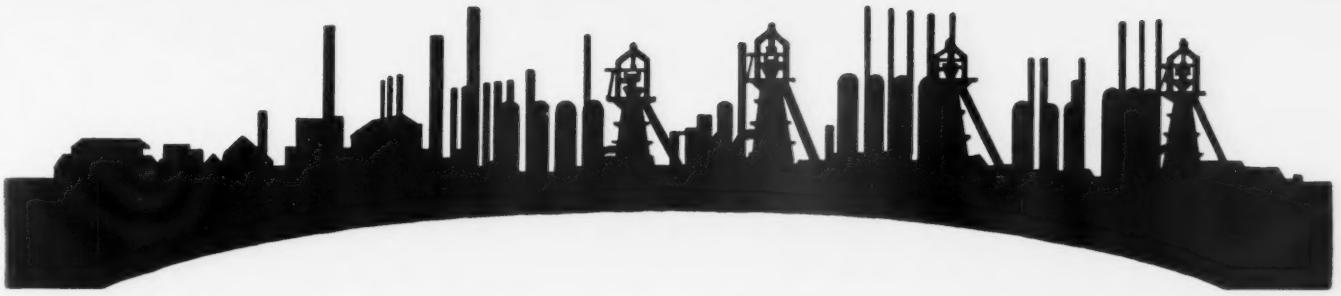
(Continued on page 170)

CHARLES T. SHEEHAN
. . . executive secretary NFA

DONALD L. MASON
. . . becomes plant engineer

ALEXANDER GOBUS
. . . heads testing department

STANLEY F. LEVY
. . . joins H. P. Deuscher



What Do Foundries Require of a Pig Iron Supplier?

A DEPENDABLE SOURCE OF SUPPLY

Throughout the past years of nation-wide shortage, Woodward Iron Company has allocated its production fairly and equitably among its established customers.

Recently added production facilities make it an even more dependable source of uniform quality pig iron for old and new customers alike.

Your inquiries for dependable Woodward pig iron are invited.

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Birmingham, Alabama

FRANK W. JONES
. . . sales mgr., Bradford Machine

GEORGE E. MILLER
. . . sales mgr., Osborn Mfg. Co.

JAMES W. STUART
. . . Osborn assistant sales mgr.

J. DOYLE ROBBINS
. . . v.p.'s assistant-Osborn

(*Continued from page* 168)

dale, Pa., is treasurer of the organization. **Charles Hamilton,** president, Alabama Pipe Co., Anniston, Ala., **William C. Baird,** president, Buffalo Pipe & Foundry Corp., Tonawanda, N. Y., and Mr. Struve, were named to the executive committee. **Homer E. Robertson** continues as executive vice president.

♦ ♦ ♦

Frank W. Jones has been appointed general sales manager, Bradford Machine Tool Co., Cincinnati, in charge of sales for the machine tool and electric tool divisions. Mr. Jones attended University of Cincinnati and Purdue University and was formerly associated with Cincinnati Bickford Tool Co.

♦ ♦ ♦

Harold E. Cleaves has retired as chief of the Chemical Metallurgy Section, National Bureau of Standards, Washington, following 26 years of service. Mr. Cleaves is best known for his outstanding contributions in the investigation of pure iron while at the bureau and has written numerous technical papers on the subject.

♦ ♦ ♦

Harold G. Haines, for the past seven years metallurgist, Howard Foundry Co., Chicago, has become affiliated with Burke Industries, Chicago, as general manager. Latter is a spinner of copper and brass.

♦ ♦ ♦

Paul McVicker, since 1949 works manager, has been appointed technical director of operations, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., Niagara Falls, N. Y. Mr. McVicker joined the company in 1926.

George E. Miller has been appointed sales manager, Machine Division, Osborn Mfg. Co., Cleveland. Mr. Miller, a graduate of Case Institute of Technology, was vice president-sales and engineering, Smith Transmission Co., Cleveland, prior to joining Osborn in 1945 as assistant sales manager. **James W. Stuart,** eastern sales representative for two years, has become assistant sales manager. A graduate of Tri-State College, Angola, Ind., Mr. Stuart was foundry manager, Product Machine & Foundry Co., Bridgeport, Conn., before he joined the Osborn organization as eastern sales engineer in 1951. **J. Doyle Robbins,** since 1950 Machine Division production manager, has been named assistant to the vice president. Mr. Robbins joined the company in 1948 as sales service manager, following graduation from Case Institute of Technology.

♦ ♦ ♦

Don McLeod has been appointed western representative in Los Angeles, Ohio Ferro-Alloys Corp., Canton, O. Mr. McLeod, who was formerly sales representative in the east central states for Ohio Ferro-Alloys, attended Case Institute of Technology and was previously associated with Warner-Swasey Co., Cleveland.

♦ ♦ ♦

Albert J. Gruenewald has been appointed sales manager of the Industrial Division, Lincoln Engineering Co., St. Louis, succeeding **T. V. Picraux,** who has been made production manager of the two company plants which produce lubricant application equipment.

♦ ♦ ♦

Harry L. Quinn, secretary, Lebanon Steel Foundry, Lebanon, Pa., has also been named general manager, one of the positions formerly held by his father, **T. S. Quinn,** who will continue as treasurer and be in overall charge of operations. **T. S. Quinn Jr.** has been named plant manager, succeeding **Leroy G. Miller,** who has been appointed chief engineer in charge of product. **John M. Quinn,** assistant plant manager, will also be responsible for all foundry operations.

♦ ♦ ♦

Harvey R. Hiller has been appointed general sales manager, Laclede-Christy Co., St. Louis, succeeding **John L. Cummings** who has been named vice president-sales director, Davis Fire Brick Co., Oak Hill, O., a company subsidiary. Mr. Hiller, a graduate of Carnegie Institute of Technology, joined the company 30 years ago and subsequently became district and regional sales manager, and assistant vice president-sales.

♦ ♦ ♦

Arthur Kloehn and **Mathias J. Bernklau,** molders, were honored recently by Falk Corp., Milwaukee, upon completion of 50 years each with the company.

♦ ♦ ♦

R. Dyner, until recently with Marathon Foundry & Machine Co., Wausau, Wis., has joined Bethlehem Foundry & Machine Co., Bethlehem, Pa.

♦ ♦ ♦

Ray Farabee has resigned as vice president, Central Foundry Co., Holt, Ala., to enter the engineering field as a consultant. He was formerly a member of the University of Alabama faculty.

♦ ♦ ♦

Albert H. Clem has been appointed general sales manager, Pennsylvania Salt Mfg. Co., Philadelphia, succeed-

(*Continued on page* 172)

CONSIDER

GOOSE LAKE

FOR YOUR FOUNDRY

GOOSE LAKE refractories have been used by leading foundries in the midwest area for over 40 years.

GOOSE LAKE FIRE CLAY BRICK are dry-pressed and de-aired assuring uniform dimensions and high density.

GOOSE LAKE GROUND FIRE CLAY, used extensively for mudding, daubing and brick laying, has adequate refractoriness and low drying shrinkage.

GOOSE LAKE FIRE CLAY FLOUR, a finely pulverized preparation, tempers quickly and is used extensively for bonding molding sands, to promote flowability, increase moisture range, and improve casting finish.

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Write today for booklet giving complete information!

ANOTHER **FOUNDRY PRODUCT!**

Grundite Bond Clay for bonding molding sands—a newly developed and different clay for malleable and many grey iron castings. Contains "Illite," an unusual, ceramic mineral.

(*Continued from page* 170)

ing the late Russell S. Roeller. Mr. Clem started in the research and development division in 1938 and later represented the metal processing department in the Detroit area.

♦ ♦ ♦

Sam R. Watkins, until recently district sales manager, Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed executive vice president, National Bearing Division, with headquarters in St. Louis. He joined Brake Shoe in 1939, following graduation from Yale University.

♦ ♦ ♦

John Stolarz has been named industrial sales manager, DeWalt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Co., New York. Following graduation from Franklin & Marshall College in 1936, Mr. Stolarz joined the DeWalt organization where he became advertising manager in 1939. He was named export sales manager in New York in 1946 and was recalled to the Lancaster office two years later as general sales manager. In 1949 he became divisional sales manager, Delta Power Tools Division, Rockwell Mfg. Co., Milwaukee, and was general sales manager there.

♦ ♦ ♦

Frank L. Doerr Jr., grinding wheel sales engineer, Electro Refractories & Abrasives Corp., Buffalo, has been transferred from Detroit to Cleveland. **William J. Eames,** who held a similar position in Buffalo, has been moved to Chicago. The following have been appointed grinding wheel sales engineers in the territories designated: **John E. Courtney,** Detroit; **Charles W. Anthony,** Central Ohio; **Sterling Muck,** Pittsburgh; **Peter Antonez,** New England; **Robert C. Hebard,** Buffalo.

♦ ♦ ♦

LeRoy A. Grettum has been named president, Pusey & Jones Corp., Wilmington, Del., succeeding **A. G. Spiegelhalter,** retired.

♦ ♦ ♦

Harvey N. Barrett Jr. has been named vice president-sales activities, Basic Refractories Inc., Cleveland. Mr. Barrett joined the company in 1934 while a student at Ohio State University and, following graduation, worked at the Maple Grove, O., plant. Later he became manager of refractory sales development, assistant to the vice president-sales, assistant to the president and recently was manager of refractory sales.

William C. Davidson, formerly engineer in the precision grinding section of the sales engineering department, Norton Co., Worcester, has been appointed abrasive engineer in the West Virginia territory. Mr. Davidson, a graduate of Ohio State University, joined the company in 1945 and was previously associated with General Motors Corp. in Dayton,

♦ ♦ ♦

R. Wolcott Hooker, director, and since 1949 vice president-sales, Hooker Electrochemical Co., Niagara Falls, N. Y., has been elected vice president while continuing active in sales. **Robert E. Wilkin,** since 1949 general sales manager, and **Frank W. Dennis,** for two years director of industrial relations for all Hooker plants, have been named vice presidents.

♦ ♦ ♦

R. S. Merrick has been appointed vice president-director of purchases, Standard Horse Nail Corp., New Brighton, Pa. **W. C. Sheers** has been named manager, production-quality control, **H. K. Anderson,** supervisor of customer service, and **Mrs. Alice Kifer,** assistant supervisor-order and invoicing department.

♦ ♦ ♦

Bryan Rudder has been appointed Philadelphia office direct salesman, A. P. Green Fire Brick Co., Mexico, Mo. Mr. Rudder was graduated from University of Missouri and until recently was a sales engineering supervisor for the company.

♦ ♦ ♦

A. C. Brown Jr. has been appointed general sales manager, Air Reduction Sales Co., with headquarters in the New York home office. Mr. Brown, a graduate of Yale University, joined Air Reduction in 1935 and was formerly salesman and branch manager, Grand Rapids, Mich., and Cleveland district manager. For over two years he has been central regional manager in Pittsburgh. **J. H. Keeney** succeeds Mr. Brown there. **J. H. Hart** has taken over Mr. Keeney's duties as administrative assistant in Pittsburgh and **R. A. Jamieson,** formerly Detroit assistant sales manager, has been named Mr. Hart's successor as Detroit district manager.

♦ ♦ ♦

E. A. Wondracheck, manufacturing manager, Electro-Motive Division, GMC, La Grange, Ill., was recently appointed to a similar position in the Fabricast Division, Bedford, Ind. He succeeds **E. E. Ward,** on leave of absence because of illness, who will become assistant to the general manager of the Fabricast Division when he returns.

♦ ♦ ♦

Thomas E. Berry has been appointed New York district manager, DeWalt Inc., Lancaster, Pa., power

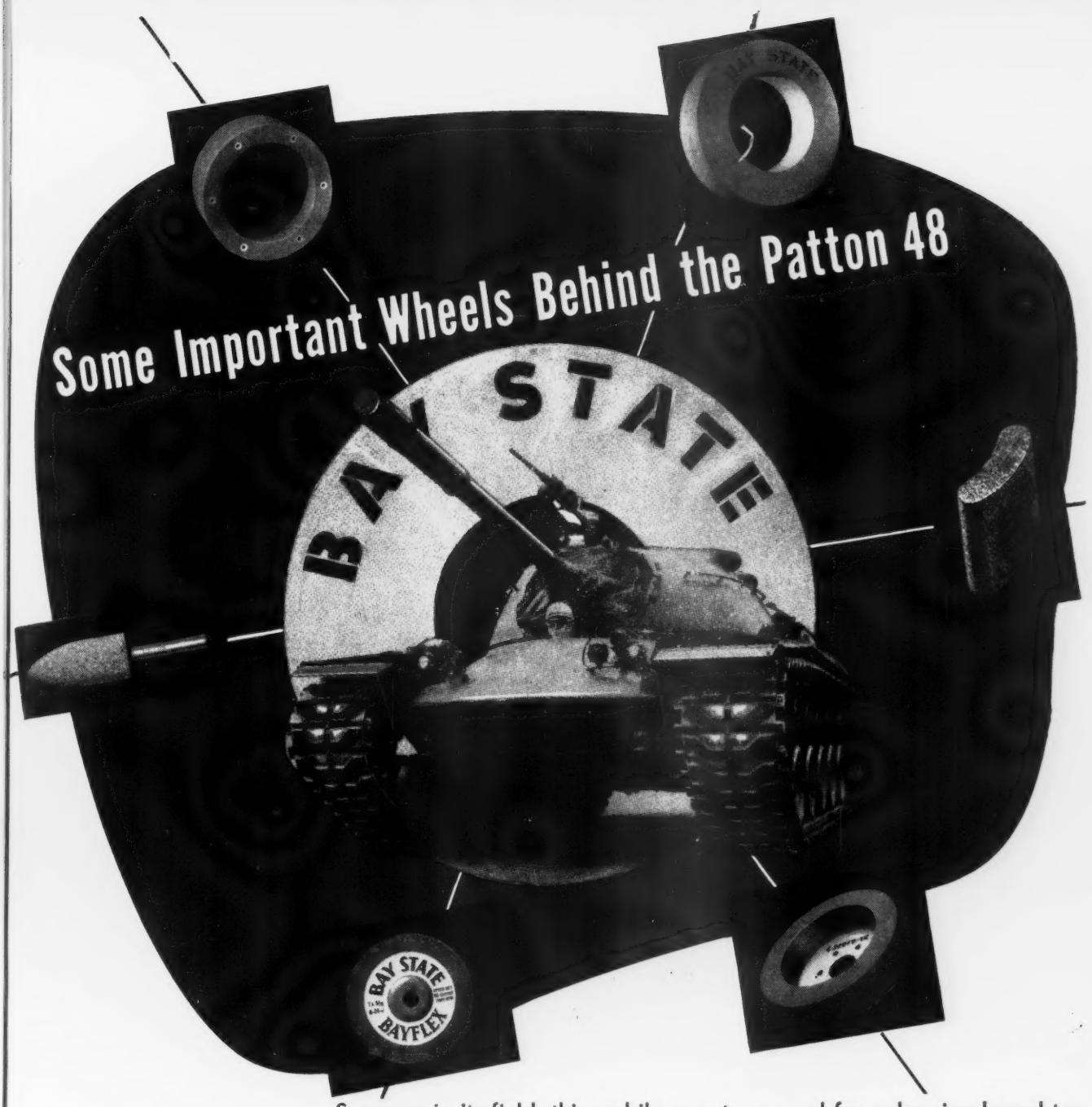
(*Continued on page* 175)

JOHN STOLARZ
. . . *DeWalt industrial sales mgr.*

HARVEY N. BARRETT JR.
. . . *v.p., Basic Refractories*

WILLIAM C. DAVIDSON
. . . *Norton sales, W. Va.*

A. C. BROWN JR.
. . . *mgr. Air Reduction sales*



Supreme in its field, this mobile monster moved from drawing board to proving ground in record breaking time. Once there, it proceeded to shatter performance records too . . . a real tribute to the superb engineering and production power of the Army Ordnance Corps and the Chrysler Corporation.

BAY STATE abrasive products, among others, were used to accomplish this feat. In particular, BAYFLEX reinforced disc-wheels were used by many Chrysler suppliers for grinding "miles" of tank-hull welds.

BAY STATE is proud to play its part in this modern miracle of stepped-up production. We salute the Patton 48 and the forward-moving program of Army Ordnance and Chrysler.

BAY STATE

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Distributors — All Principal Cities
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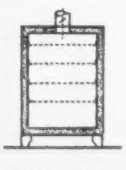
ALL TYPES OF QUALITY PRODUCTS FOR GRINDING

Lower Your Core Baking Costs with a DESPATCH VERTICAL OVEN

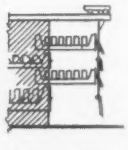
Here are important reasons why foundrymen choose DESPATCH VERTICAL OVENS to handle their core baking production . . . reasons they have proved over and over again, that DESPATCH core baking costs are lower, while core quality and production are higher.

1. **MAXIMUM PRODUCTION WITH LIMITED FLOOR SPACE:** Many foundries report doubling their core baking output on 75% less floor space.
2. **BEST USE OF MANPOWER:** Higher core output per man because of simplified loading and handling. Continuous conveyor makes possible more cores faster.
3. **HIGHER UNIFORMITY, FEWER REJECTS:** Automatically controlled heat and time cycles eliminate human element . . . give uniform, high quality cores with every load. Fewer rejects, fewer make-overs.
4. **FLEXIBILITY IN OPERATION:** Large capacity DESPATCH forced-convection heating system and ease of core handling permit a wide range of core sizes and shapes to be baked at one time, all with the same uniformity.
5. **BUILT FOR HARD SERVICE:** DESPATCH Core Baking and Mold Drying Ovens are purposely designed for tough foundry work, and long, trouble-free performance. Heavy-duty rugged construction, adequate reinforcements mean years of continuous service with a minimum of maintenance.
6. **ECONOMICAL TO OPERATE:** DESPATCH Ovens make excellent use of the most economical fuel available. 100% convection heated . . . high volume fans . . . large heat ducts. Special design and insulation keep heat loss at a minimum.

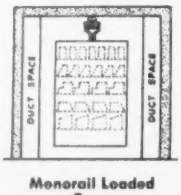
DESPATCH FOUNDRY OVENS FURNISHED IN COMPLETE RANGE OF SIZES, CAPACITIES AND FOR WIDE CHOICE OF MATERIAL HANDLING METHODS



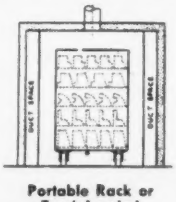
Shelf Type Oven



Drawer Type

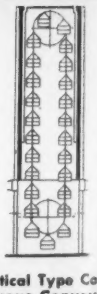


Monorail Loaded Type



Portable Rack or Truck Loaded

Elevated Type Continuous Conveyor



Vertical Type Continuous Conveyor

ENGINEERED TO SUIT YOUR NEEDS!

Every DESPATCH core baking and mold drying oven is engineered to fit your particular need. DESPATCH engineers are ready to help you with your foundry requirements. They will offer advice, or will design, build and install equipment that will provide speed, uniformity and economy in all your core baking and mold drying operations. MODERNIZE WITH DESPATCH FOR MORE PROFIT. Write for full information to Dept. N.

DESPATCH OVEN COMPANY

Minneapolis Office: 619 S. E. 8th Street

Chicago Office: 4554 N. Broadway

Sales Offices in all Principal Cities

PIONEERS IN ENGINEERING HEAT APPLICATIONS FOR INDUSTRY

ROBERT G. MORGAN
. . . Timken mgr., Moline, Ill.

ROBERT L. WILLIAMS
. . . Timken mgr., St. Thomas, Ont.

WILLIAM RODGERS
. . . sales mgr., Blaw-Knox Co.

LESTER A. SHEA
. . . Lindberg Engineering sales

(*Continued from page* 172)
cutting tools. Mr. Berry attended Yale and Columbia Universities and prior to joining the DeWalt company was engaged in welding industry sales and sales promotion work for Scovill Mfg. Co., Waterbury, Conn.

♦ ♦ ♦

Robert G. Morgan has been appointed Moline, Ill., district manager, Timken Roller Bearing Co., Canton, O. Mr. Morgan joined the company in 1937 and worked in the automotive division, industrial and automotive sales order department. Recently he has been in the St. Thomas, Ont., office, where **Robert L. Williams** has succeeded him as district manager. Mr. Williams, a graduate of Case Institute of Technology, was assigned to the Cleveland office in 1940, two years after he joined the company. In 1943 he began a period of service with the U. S. Navy.

♦ ♦ ♦

Herbert P. Dales has been appointed sales manager and **Carl L. Adelman,** assistant sales manager, Coated Products Division, the Carborundum Co., Niagara Falls, N. Y. They will be located in Wheatfield, N. Y., division headquarters. Mr. Dales was previously Chicago district assistant sales manager. Mr. Adelman, formerly New York district salesman, for the past 3 years has sold coated abrasives exclusively.

♦ ♦ ♦

Dr. **Elmer H. Schulz,** formerly manager of the physics and electrical engineering division, has been named director of research, Armour Research Foundation, Illinois Institute of Technology. **Dr. Maurice J. Day,** manager of the materials and processes division, has been named assistant director for program development.

William Rodgers has been appointed general sales manager, Blaw-Knox Co., Pittsburgh. He will co-ordinate sales activities for all divisions and assist in development of sales objectives, policies and programs. Mr. Rodgers, a graduate of Lehigh University, in recent years has been president, Moore-Flesher Hauling Co., Rodmor Hauling Co., both of Pittsburgh, and president, Lake Equipment Corp., Erie, Pa. He is also a director of Granite City Steel Co., Granite City, Ill.

♦ ♦ ♦

F. J. Koegler has been named vice president, National Lead Co., New York, and general manager of its recently formed Doehler-Jarvis Division, with headquarters in the Toledo, O., plant where he will direct die casting operations of the parent company. Mr. Koegler, with Doehler-Jarvis since 1913, became treasurer-director in 1926, vice president in 1933, executive vice president in 1948 and has been president for the past year.

♦ ♦ ♦

John W. Greenstreet has been appointed representative for the Chesapeake Bay-New Jersey territory, Frederic B. Stevens Inc., Detroit, with headquarters in the Buffalo office. Mr. Greenstreet has been associated with the foundry industry for 30 years in production and more recently in equipment sales positions.

♦ ♦ ♦

John R. Hogan has been appointed sales agent in northeastern Ohio and Erie, Pa., for H. F. Black Equipment Co., Cleveland distributor for Elwell-Parker Electric Co., Cleveland. Mr. Hogan, a graduate of Pennsylvania State College, has been active in industrial truck sales and engineering services since 1947.

Lester A. Shea, recently chief of the industrial heating equipment section, Metalworking Equipment Division, National Production Authority, Washington, has returned to Lindberg Engineering Co., Chicago, as general sales manager where he will head expansion plans and moving of the company's air and hydraulic division to a new location.

♦ ♦ ♦

Richard A. Smith, formerly vice president, Sterling Wheelbarrow Co., West Allis, Wis., has been elected president, succeeding his father, the late Irving R. Smith. **Harold E. Smith** has been named vice president and **Martin A. Dooley** treasurer and a director. **H. A. Frank** is vice president-purchases, **John T. Hegner,** comptroller, **Wesley J. Mueller,** works manager, and **C. A. Gehrman,** general sales and advertising manager. **Gerald L. Smith** and **Robert W. Smith** are new directors.

♦ ♦ ♦

C. Lynn Frost has been appointed advertising manager, Hewitt-Robins Inc., Stamford, Conn., conveyor machinery, rubber belting, hose, etc. Mr. Frost has been with the company since 1949.

♦ ♦ ♦

George W. Urban has been appointed purchasing agent, Cleveland Crane & Engineering Co., Wickliffe, O., to replace Henry Karr, who has retired following 50 years of service. Mr. Urban was assistant purchasing agent for the past 7 years.

♦ ♦ ♦

P. J. Castora, formerly staff engineer, Aluminum Co. of America, Pittsburgh, has been appointed vice president - engineering and sales, Pittsburgh Engineering & Machine

(*Continued on page* 178)

ADAMS MOLDING MACHINES

Boost Your Foundry's Profits

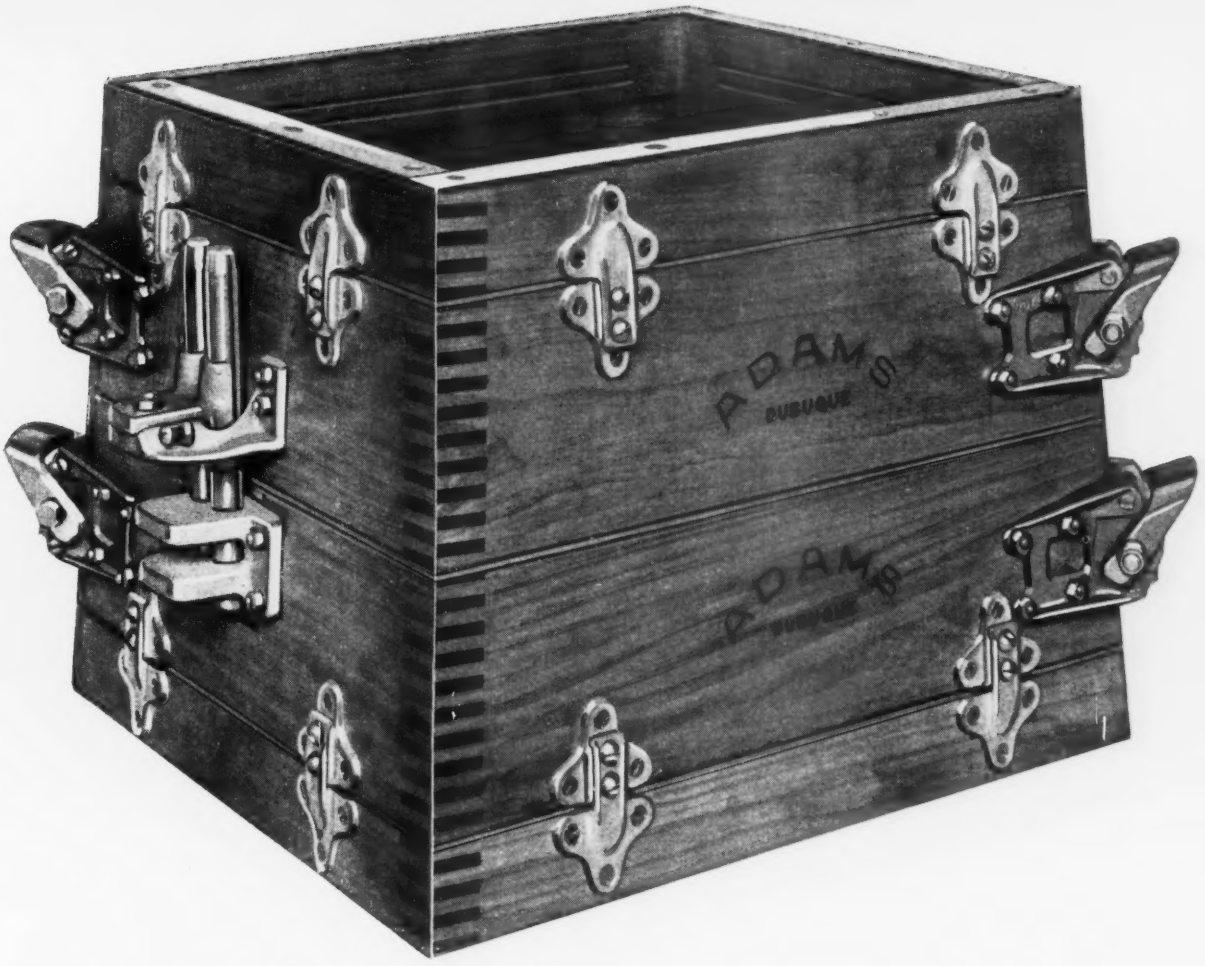
WITH THIS

WINNING COMBINATION

THE ADAMS

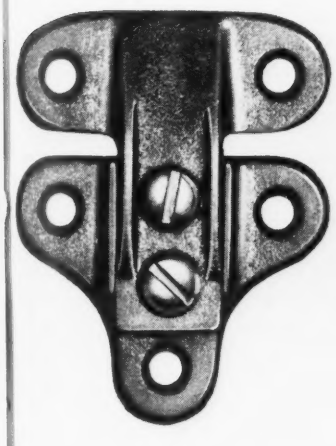
DUBUQUE,

MOLDING MACHINES . . . . . FLASK



ADAMS **CHERRY EASY-OFF FLASKS**

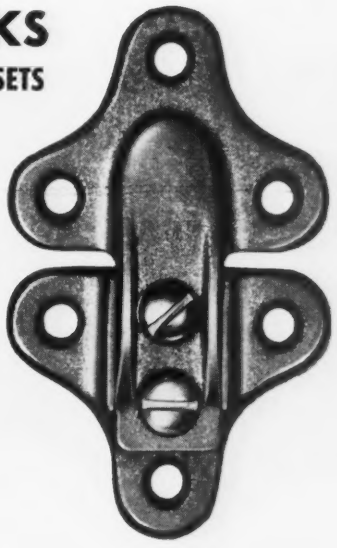
MODERNLY EQUIPPED WITH ADAMS CHERRY UPSETS



ADAMS UPSET BRACKETS

FOR CHERRY UPSETS

FOR ALL
ADAMS CHERRY FLASKS



COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

BRUCE H. RASMUSSEN
. . . sales mgr., Miller Motor

EDWARD A. MACKE JR.
. . . joins H. S. Bell Co.

R. L. REED
. . . Electromet sales, Detroit

S. L. JACKSON
. . . Electromet sales, Los Angeles

(*Continued from page* 175)

Co., Glassport, Pa. Previous connections include E. W. Bliss Co., Salem, O., and United Engineering & Foundry Co., Pittsburgh.

♦ ♦ ♦

Bruce H. Rasmussen has been appointed sales manager, Miller Motor Co., Melrose Park, Ill. A graduate of University of Iowa, Mr. Rasmussen was associated with J. T. Baker Chemical Co., Phillipsburg, N. J. for 19 years as Chicago branch manager, then sales manager of its laboratory chemical, and government contract divisions. Recent additions to Miller factory salesmen include: **Jack Frink** and **John Vaas,** Chicago; **Stephen Stiles,** Detroit; and **Roger Lawson,** Cleveland - Akron - Youngstown area.

♦ ♦ ♦

Warren R. Spofford has been assigned the metropolitan Boston territory, recently developed by Norton Co., Worcester, Mass., following resignation of **Raymond J. Forkey** who has joined Coppus Engineering Corp., Worcester. **Sidney B. Wetherhead** will represent Norton in Mr. Forkey's former territory in eastern Massachusetts, excluding the new Boston area. **Gordon T. Rideout** has succeeded Mr. Spofford as abrasive engineer in Worcester County. **Evan C. Luce** has been appointed sales engineer and will assume Mr. Rideout's former position in the Worcester sales engineering department. **David H. Paul,** who recently returned to Norton following Navy service, has been appointed Philadelphia district field engineer.

♦ ♦ ♦

Edward A. Macke Jr. has been appointed sales representative of metallurgical products, Tennessee Products & Chemical Corp., Nashville, Tenn., by its distributor S. H. Bell Co., Pittsburgh. Mr. Macke, who attended Carnegie Institute of Technology, was formerly maintenance metallurgist at the Pittsburgh Works of the Jones & Laughlin Steel Corp. for 16 years.

S. L. Jackson and **R. L. Reed** have been appointed Los Angeles and Detroit district managers, respectively, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York. Mr. Jackson was graduated from Colorado School of Mines and joined the company in 1942. He was named Chicago office salesman in 1946 and has been engaged in sales work in the Los Angeles office since 1949. Mr. Reed, a graduate of Ohio State University, entered the Chicago office in 1946 and has been in the Detroit office of the company since 1948.

♦ ♦ ♦

Charles T. White Jr., formerly belting sales engineer, Industrial Products Division, Goodyear Tire & Rubber Co., Akron, O., has been appointed Pittsburgh district manager. Mr. White joined the industrial products division in 1947 following graduation from University of Nebraska. In 1949 he became industrial products field representative in Greensboro,

(*Concluded on page* 181)

WARREN R. SPOFFORD
. . . Boston sales, Norton Co.

GORDON T. RIDEOUT
. . . Worcester county sales, Norton

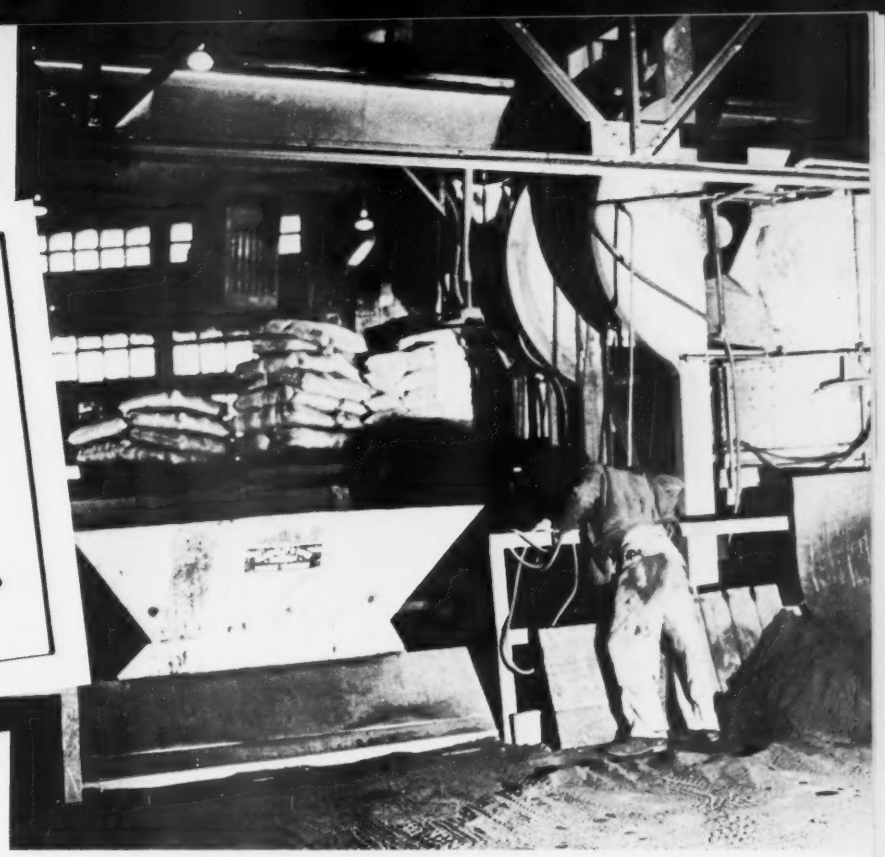
DAVID H. PAUL
. . . Philadelphia sales, Norton

CHARLES T. WHITE JR.
. . Goodyear Pittsburgh mgr.

450 tons of sand...

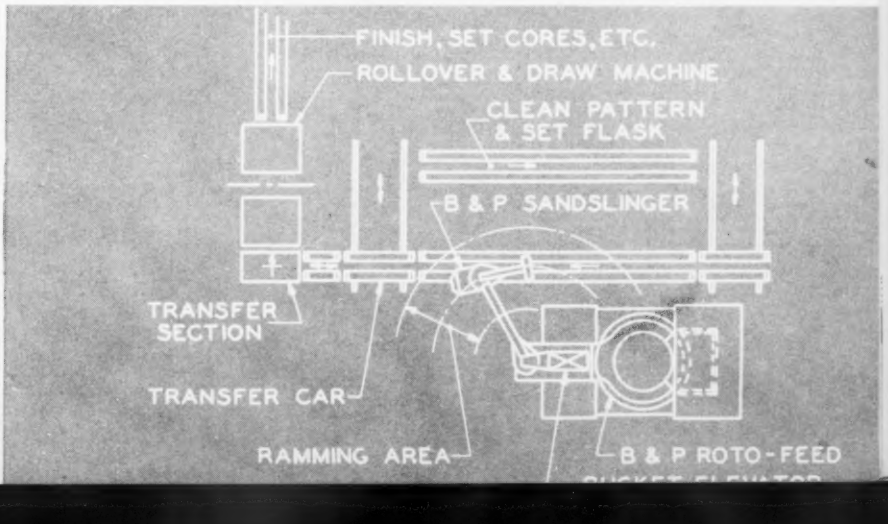
conditioned, mulled and cooled each night at Peerless Foundry Co., Cincinnati

ONE SPEEDMULLOR-PREPARATOR UNIT handles all molding sand in the foundry . . . over 450 tons per night, every night! Sand is completely conditioned, mulled, and cooled in one-ton batches in 67-second cycles. The tripled capacity made possible for Peerless by the Speedmullor-Preparator and a Stationary Sandslinger Molding Unit has widened the range of this foundry's work, in addition to making production more profitable and efficient. Let us send you a copy of BETTER METHODS with the full story on Peerless as written by its president, Stephen Dana. Write today to Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Ill.



All molding sand in the foundry—over 450 tons every night—is completely conditioned, mulled, and cooled in this one Speedmullor-Preparator Unit, a key factor in the greatly increased production achieved by Peerless.

The Peerless Foundry slinger molding unit combines layout ingenuity with the proper selection of equipment. Separate flask set-up conveyor and ramming conveyor, joined by transfer sections, provide ample flexibility for handling many different patterns.



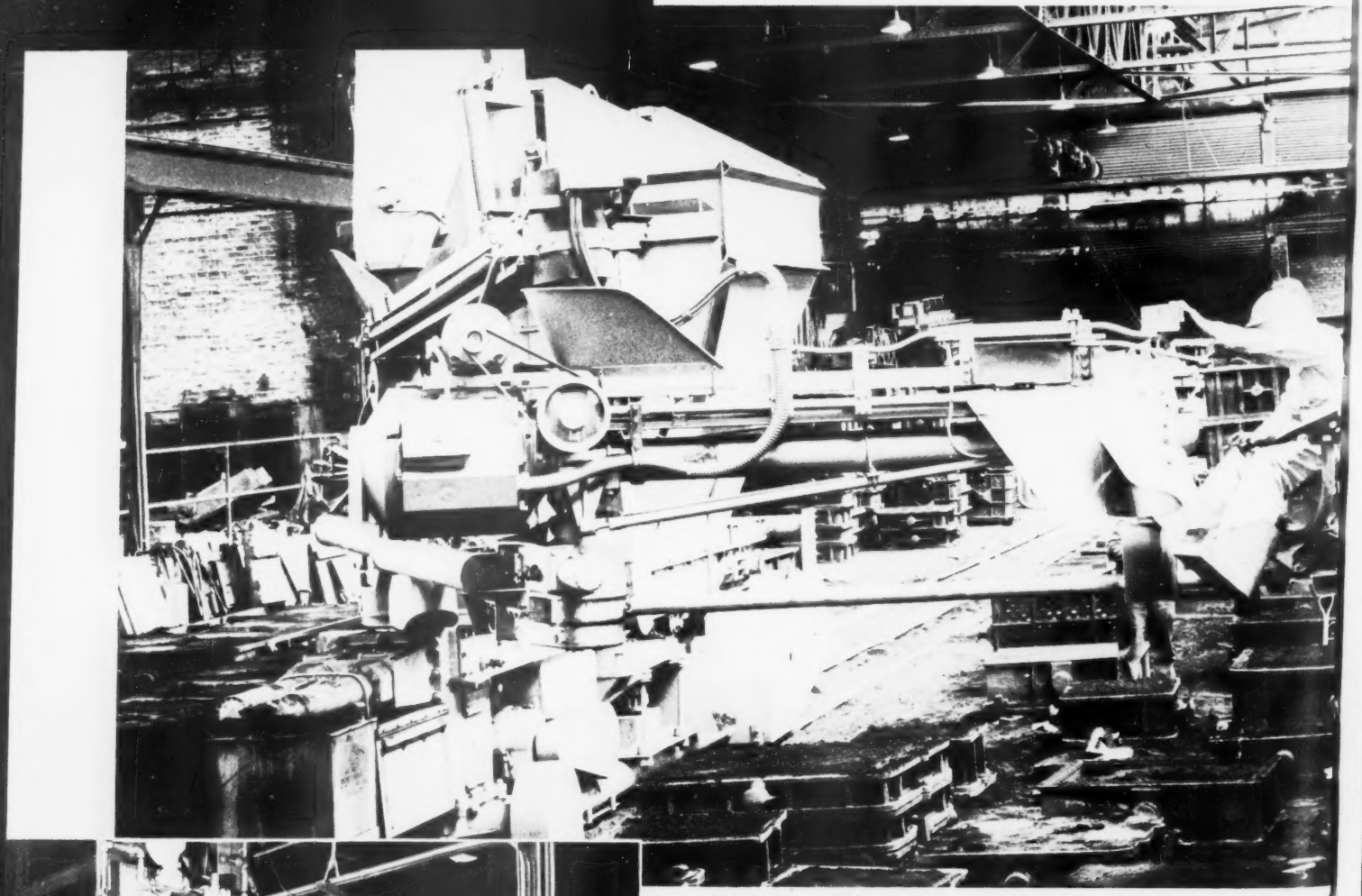
LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

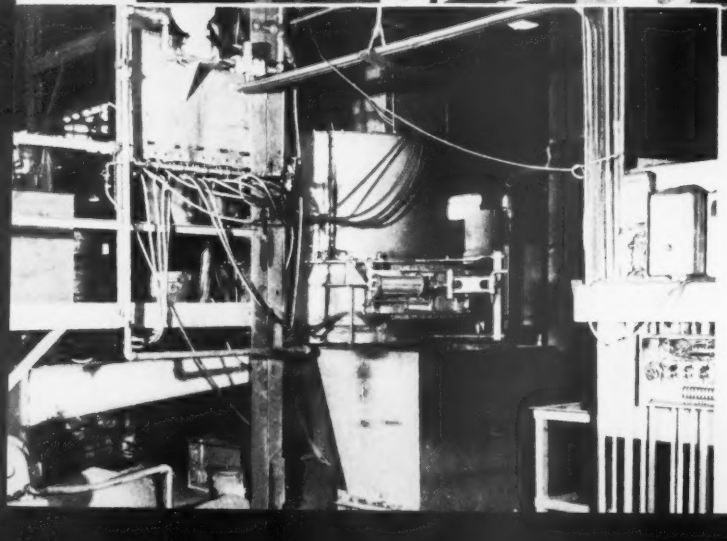
Flasks and patterns are set up for ramming on one conveyor as a mold is rammed on the other by the slinger.

38% Man-hour saving follows GISHOLT MECHANIZATION

Putting a B & P Speedslinger on the job has helped Gisholt Machine Company, Madison, Wis., effect a 38% saving in man-hours required for molding and shakeout. Also contributing to improved efficiency in Gisholt's mechanization program is a Speedmullor which enables mulling of all sand to be done by two men in 14 hours. This compares with former methods under which only the facing sand was mulled—less than half the amount now handled—in 32 man-hours.

Get the complete story of Gisholt's foundry mechanization program in BETTER METHODS. Write today for your copy to Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Illinois.





Main bay of the Gisholt foundry where the Speedslinger is ramming some of the smaller molds. The majority of Gisholt molds are now slinger rammed.

Return sand is delivered to a five-ton hopper located above the Speedmullor. It is charged into the Speedmullor in 1800 lb. batches which are mulled and cooled during a one to one and one-half minute cycle.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

(*Concluded from page 178*)

N. C., and two years later was named senior staffman in industrial products sales, Akron.

♦ ♦ ♦

Russell P. Colosi has been appointed assistant to the Cleveland district sales manager, the Carborundum Co., Niagara Falls, N. Y. **Charles J. Walter** has succeeded Mr. Colosi as Cleveland office manager. **Wilfred Robson** becomes office manager in the Los Angeles district office, the position formerly held by Mr. Walter. **Joseph A. Marrone,** since 1949 chief stock clerk in the Chicago office, has been appointed to Mr. Robson's former position, assistant office manager of the Chicago district.

♦ ♦ ♦

Paul L. McCullough Jr. has been appointed sales manager, Electro-Alloys Division, American Brake Shoe Co., Elyria, O. He has been Pittsburgh district sales manager for the American Manganese Steel Division since 1951. Prior to that he was sales engineer for the Amsco and Electro-Alloys divisions.

♦ ♦ ♦

Samuel A. Wenk has been named to supervise nondestructive testing research, Battelle Institute, Columbus, O., where for the past 3 years he has been associated with research in connection with detection of flaws in engineering materials. Mr. Wenk was graduated from Virginia Polytechnic Institute and joined the Battelle staff in 1948. Prior to that he was chief metallurgist, Bowser Inc., Fostoria, O.

♦ ♦ ♦

Glenn Wilt has been named chairman of the board of directors, a new position recently created by Massillon Steel Castings Co., Massillon, O. **I. M. Emery** has been elected president-general manager, succeeding the late Frank O. Humburger. **Harold C. Binge** was made secretary-treasurer.

♦ ♦ ♦

Gale P. Foster has been appointed Cleveland branch manager and **Joseph G. Haegele Jr.,** Kansas City branch manager, the Howe Scale Co., Rutland, Vt. Mr. Foster, recently released from U. S. Air Force duty in Alaska, was previously company sales promotion manager. Mr. Haegele has been St. Louis sales representative.

♦ ♦ ♦

Ralph M. Stair, vice president, General Malleable Corp., Waukesha, Wis., was named "young man of the year" by the Junior Chamber of Commerce there.

♦ ♦ ♦

Gordon A. Wiltse has been elected secretary, Parker-Street Castings Co., Cleveland. **Albert F. Skok** has been appointed assistant secretary-purchasing agent. Mr. Wiltse, who was appointed general manager a year ago, will continue in that capacity. He has been with the company 23 years and is also a director.

♦ ♦ ♦

Devon W. Fryback has been named eastern regional sales manager, Industrial Division, Minneapolis-Honeywell Regulator Co., Philadelphia, and **O. B. Pyle Jr.,** mid-Atlantic industrial manager. **Edwin J. Klein** has been appointed industrial manager for the Philadelphia branch office. Mr. Fryback joined the company in 1927 and has been industrial manager in Hartford, Conn., and branch manager in Albany, N. Y. Mr. Pyle has been in the Philadelphia office for 24 years, recently as industrial manager.

♦ ♦ ♦

H. F. Maloney Jr. has been named Cleveland district sales manager, Brown Fintube Co., Elyria, O., maker of heat transferring products. He has been with the firm since 1947.

♦ ♦ ♦

E. F. Mitchell, for 16 years Michigan territory sales representative, Simonds Abrasive Co., Philadelphia, has been appointed Detroit district manager.

♦ ♦ ♦

Cliff M. Estes, controller, Texas Foundries Inc., Lufkin, Tex., has been elected to membership in the Controllers Institute.

Meetings of Interest to Foundrymen

May 1 — American Association of Spectrographers, symposium, Chicago

May 4-8 — American Foundrymen's Society, annual convention, Chicago

May 18-22—Material Handling Institute, fifth national materials handling exposition, Convention Hall, Philadelphia

May 20-22—Society for Experimental Stress Analysis, spring meeting, Hotel Schroeder, Milwaukee

May 25-28—Air Pollution Control Association, annual meeting, Lord Baltimore Hotel, Baltimore

May 27-29—American Society for Quality Control, annual convention, Convention Hall, Philadelphia

June 8-10—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

June 29-July 3—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City

Sept. 16-18 — National Foundry Association, annual meeting, Plaza Hotel, New York

Sept. 17-18—Western New York Regional Foundry Conference, sponsored by Western New York Chapter of the AFS, Buffalo

Sept. 19-26 — International Committee of Foundry Technical Associations, annual foundry congress, Paris, France

Sept. 21-22—Steel Founders' Society, fall meeting, Homestead, Hot Springs, Va.

Sept. 21-25—Instrument Society of America, national congress and exhibit, Sherman Hotel, Chicago

Sept. 24-25 — Ohio Regional Foundry Conference, sponsored by University of Cincinnati and Ohio AFS Chapters, Cincinnati

Oct. 8-9—Gray Iron Founders Society, annual meeting New Hotel Jefferson, St. Louis

Oct. 8-9—Michigan Regional Foundry Conference, Kellogg Center, Michigan State College, East Lansing, Mich.

Oct. 15-17—Foundry Equipment Manufacturers' Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 19-23—American Society for Metals, national metal congress and exposition, Public Auditorium, Cleveland

Oct. 29-30—Metal Castings Conference, sponsored by Purdue University, Michiana and Central Indiana AFS chapters, Purdue University, West Lafayette, Ind.

Left: Yard cranes are equipped with lift magnets to assemble metal charges for the cupola

Right: Conveyor belt carries prepared sand which is plowed off into the molder's hoppers

Below: Lift truck stacks boxes of various alloys and castings in a foundry storage section

MATERIALS HANDLING EXPOSITION

To Be Held in Philadelphia, May 18-22

MANY new models of equipment and numerous developments in the field of materials handling will be shown for the first time at the fifth National Materials Handling Exposition at Convention Hall, Philadelphia, May 18-22. Of major interest to visitors at this year's show will be the emphasis on systems of materials handling and various types of equipment to perform special functions.

It will be one of the largest industrial capital goods expositions to be held in Philadelphia and the largest to be held anywhere in the country during 1953, requiring all six areas in Convention Hall. A total of 284 companies will exhibit equipment, including lift and fork trucks, conveyors, hoists, monorails, cranes, tractors, trailers, hand trucks, stacking units, portable elevators, skids, pallets, and their respective accessories. All of the equipment to be on display is valued in total at more than $10 million.

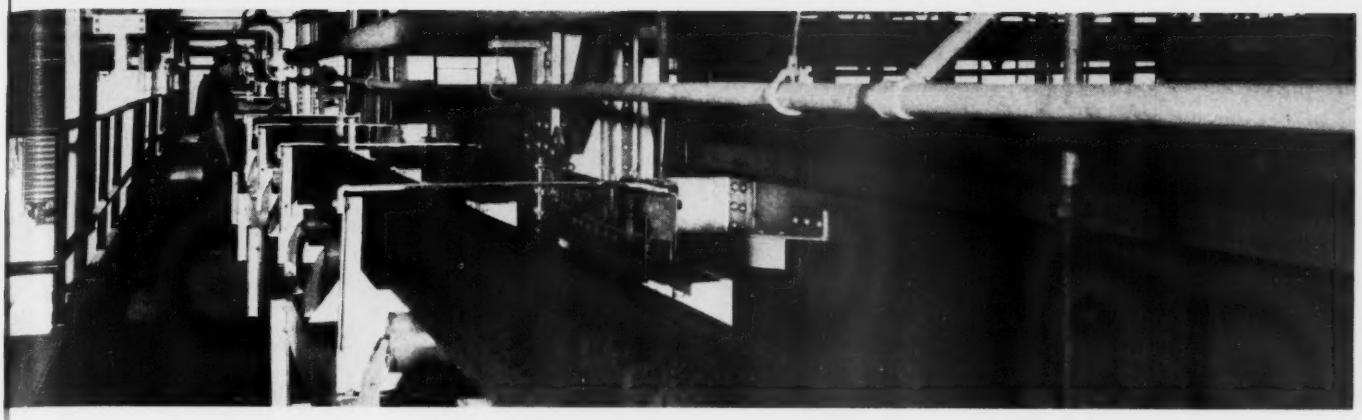
In keeping with one of the basic purposes of most equipment featured at the show—to keep materials in process on the move—many of the exhibiting companies have taken large areas of space so that they might demonstrate use of their equipment under simulated plant conditions. Some exhibitors have taken as much as 7000 sq ft of space.

The exposition is sponsored by the Material Handling Institute, an organization of handling equipment manufacturers, and conducted by Clapp & Poliak Inc., New York, founder of the show. More than 25,000 visitors from the United States and a large number of foreign countries are expected to attend. Because of the extensiveness of the show, some major users of materials handling equipment will send teams of as many as 20 men to inspect the exhibits. A preliminary study of the proposed displays indicates that a staff of seasoned men would be required to inspect and evaluate all the machines to be shown during the five-day period of the show. Studies made at a previous show indicate that 90 per cent of those who attend are directly responsible for authorization or recommendation of capital goods purchased for their companies.

So great is the interest in this show that reservations of hotel space in New York and Atlantic City were necessary to provide for the overflow from Philadelphia hotels.

The American Material Handling Society, composed of executives of companies which use materials handling systems, will conduct a conference concurrently with the show. A group of 42 speakers, representing many of the outstanding industries in the country, will head discussion sessions at the conference. Sessions will cover five basic aspects of materials handling and will be held

WITHIN recent years *FOUNDRY* has published a series of articles dealing with materials handling in the foundry yard, metal charging, molding, coremaking, metal pouring, shakeout, and casting cleaning. These are being gathered together for reprinting in single pamphlet form and will be available in the near future. Copies may be had by writing to *FOUNDRY*, Penton Building, Cleveland 13.

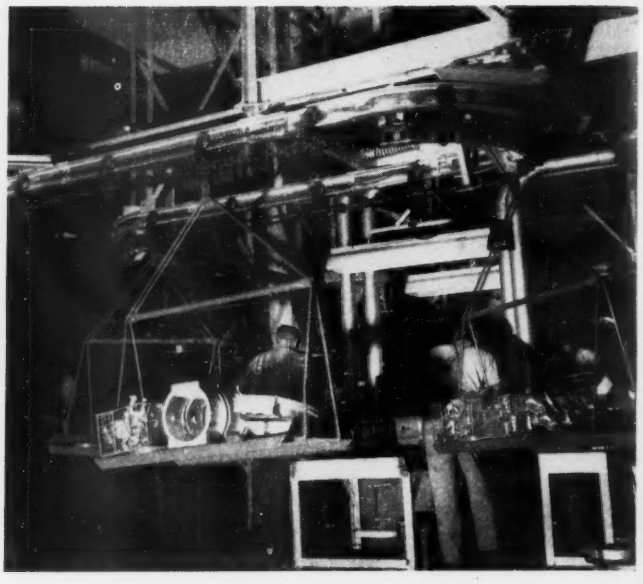


Conference Program

JAMES B. McGINN, Chairman
Division Engineer, Material Handling Division,
American Viscose Corporation, Philadelphia, Pa.

	Tuesday, May 19	Wednesday, May 20	Thursday, May 21
	COCHAIRMAN: James J. MacDonald supervisor, factory methods and engineering section General Electric Co. Philadelphia	**COCHAIRMAN:** Norman B. Shikes manager, material handling division RCA-Victor Div. Radio Corp of America, Camden, N. J.	**COCHAIRMAN:** Edwin S. Kostro general superintendent Philco Corp. Philadelphia
Handling in Process	**MODERATOR** George A. Smith material handling engineer International Business Machines Corp. Endicott, N. Y. **COMODERATOR** S. P. McDaniels material handling engineer Western Electric Co. Kearny, N. J.	**MODERATOR** J. Wilfred Ferguson material handling engineer American Locomotive Co. Schenectady, N. Y. **COMODERATOR** James R. Bright editor *Modern Materials Handling* Boston	**MODERATOR** R. W. Mallick staff engineer Westinghouse Electric Corp. East Pittsburgh, Pa. **COMODERATOR** Lee B. Russell plant engineer Brown-Forman Distillers Corp. Louisville
Warehousing and Shipping	**MODERATOR** E. J. Klinstiver supervisor Hall's City Transfer Co. Jeffersonville, Ind. **COMODERATOR** Harold L. Bock material handling engineer RCA-Victor Div., Radio Corp. of America Indianapolis	**MODERATOR** Adolph L. Sebell plant engineer Will & Baumer Candle Co. Syracuse, N. Y. **COMODERATOR** William T. German supervisor of stores Glenn L. Martin Co. Baltimore	**MODERATOR** L. George Roedding material handling supervisor American Box Board Co. Grand Rapids, Mich. **COMODERATOR** G. M. Holland sales engineer Yarrington & Johns Inc. Baltimore
Packaging for Improved Handling	**MODERATOR** R. C. Mottu supervisor of stores Koppers Co. Baltimore **COMODERATOR** F. H. Lee packaging engineer Aluminum Co. of America New Kensington, Pa.	**MODERATOR** Carl R. Plock sales engineer Logan Co. Louisville **COMODERATOR** Adrian V. Van Riper packaging engineer Congoleum Nairn Inc. Kearny, N. J.	**MODERATOR** Ray E. Pigg methods engineer Eli Lilly & Co. Indianapolis **COMODERATOR** R. W. Hawkes head of material handling H. J. Heinz Co. Pittsburgh
Bulk Handling	**MODERATOR** O. W. Werner sales manager Link-Belt Co. Pittsburgh **COMODERATOR** J. M. Broady co-ordinator of material handling methods General Electric Co. Schenectady, N. Y.	**MODERATOR** Benjamin H. King transportation superintendent E. I. Du Pont de Nemours & Co. Arlington, N. J. **COMODERATOR** F. W. Adami Jr. assistant to supervisor of engineering Gillette Safety Razor Co. Boston	**MODERATOR** W. W. Phillips manager, raw material handling Eli Lilly & Co. Indianapolis **COMODERATOR** Charles H. Asher material handling engineer American Radiator & Standard Sanitary Corp. Louisville
Requirements for Organization-Study-Analysis	**MODERATOR** Donald C. Rhodes chief industrial engineer Pitman-Moore Co. Indianapolis **COMODERATOR** Donald R. Neil consulting engineer Drake, Startzman, Sheahan, Barclay, Inc., New York	**MODERATOR** Alfred L. Struck Jr. technical assistant Colgate-Palmolive Peet Co. Jeffersonville, Ind. **COMODERATOR** C. W. Wirshing materials handling engineer Bahr-Manning Corp. Troy, N. Y.	**MODERATOR** Herbert H. Hall material handling engineer Aluminum Co. of America Pittsburgh **COMODERATOR** Allen F. Hardy plant engineer Norton Co. Worcester, Mass.
ALTERNATES	W. C. Carl industrial engineer Westinghouse Electric Corp. East Pittsburgh, Pa. H. Barber industrial engineer American Box Board Co. Grand Rapids, Mich.	W. K. Dietz transportation supervisor Glenn L. Martin Co. Baltimore L. E. Fink methods engineer General Electric Co. Schenectady, N. Y. G. H. Schwab material handling engineer General Electric Co. Schenectady, N. Y.	E. D. Blickenstaff assistant general storekeeper Aluminum Co. of America Pittsburgh Robert H. Daut general manager Harborside Warehouse Co. Jersey City, N. J. C. Deverall industrial consultant Indianapolis W. Van Alan Clark assistant professor of business management MIT, Cambridge, Mass.

Top roller conveyor brings empty flasks to molder. Completed molds leave on center and bottom rollers



Castings are carried through cleaning department on trays suspended by bails from overhead monorail

from 9 a.m. to noon May 19, 20 and 21. Each of five topics will be the subject of a seminar on each of the three days.

Subjects for the seminars are: "Handling in Process," "Warehousing and Shipping," "Packaging for Improved Handling," "Bulk Handling" and "Requirements for Organization, Study and Analysis." Because many of those attending the conference are authorities on various phases of materials handling, the sessions are expected to provide a wealth of important new ideas on handling problems.

Repetition of each subject on each of the three days will give visitors an opportunity to sit in on the same subject during the entire conference if they choose to do so. Because different moderators will guide each day's seminar, a fresh slant or approach to the subject is anticipated at each discussion session. Comments from participants in the sessions, many of whom will be the country's leading materials handling experts, will bring current handling experience directly into the discussions. This is the first materials handling conference that has used the novel approach of open, informal seminars for all sessions.

James B. McGinn, division engineer, material handling division, American Viscose Corp., Philadelphia, is conference chairman. Cochairmen are: J. J. MacDonald, supervisor, factory methods and engineering section, General Electric Co., Philadelphia; Norman B. Shikes, manager, material handling division, RCA-Victor Division, Radio Corp. of America, Camden, N. J., and Edwin S. Kostro, general superintendent, Philco Corp., Philadelphia.

Important advances in American production during postwar years have taken place in the field of materials handling. Since 1947, the year of the first materials handling show, most plants have given increased attention to the handling of materials and no new plant is being constructed without consideration of the problems of handling. Most economists agree that handling is a fertile field for cost reduction. Despite advances of recent years, nearly 25 per cent of production payrolls still is expended for no better purpose than picking things up, moving them, and putting them down again.

And in foundries it is necessary to handle approximately 170 tons of materials and equipment for every ton of cleaned castings produced. Consequently the efficient application of proper equipment is bound to effect little economies here and there in the handling of materials. Little savings bulk large in the aggregate, and who can ignore reduced cost of production in today's competitive picture?

The show and the conference at Philadelphia promise a bristling bundle of cost-saving ideas for the foundryman anxious to alleviate some of his materials handling problems.

LIST OF EXHIBITORS

SHOWING EXHIBIT BOOTH NUMBERS

Acme Pallet Co. Inc., New York 1149
Acme Steel Co., Chicago 1002
Aerol Co., Los Angeles 1522, 1524
Aeroquip Corp., Jackson, Mich. 1129
Ainsworth Mfg. Corp., Detroit 1818, 1822
Albion Industries Inc., Albion, Mich. ... 315, 317
Alemite Sales Division, Stewart-Warner Corp., Chicago 529, 531, 533
Algene Marking Equipment Co., New York . 212
All Steel Welded Truck Co., Rockford, Ill. 106, 108, 207, 211
Allen Industrial Products Inc., Battle Creek, Mich. 1810
Alvey-Ferguson Co., Cincinnati 1455
Allied Wheel Products Inc., Ansonia, O. ... 1831
American Chain & Cable Co., Bridgeport, Conn. 732
American Machine & Foundry Co., New York . 1133
American Matting Corp., Detroit 1021
American Monorail Co., Cleveland 610, 614, 711, 715
American Pulley Co., Philadelphia 821
American Steel & Iron Works Inc., Division of A. F. Anderson Iron Works., Chicago .. 128
American Tape Printer Co., New York 332
American Tractor Corp., Churubusco, Ind. ... 926
Anchor Steel & Conveyor Co., Dearborn, Mich. 532
Anthony Co., Streator, Ill. 620
Arrow Products Inc., Grand Rapids, Mich. ... 434
Austin-Western Co., Aurora, Ill. 1142, 1146
Automatic Transportation Co., Chicago .. 1306, 1405
Auto-Nailer Co., Atlanta, Ga. 629

Baker Industrial Truck Div., Baker-Raulang Co., Cleveland 1234, 1237
Baker-Lull Corp., Minneapolis 1326
Baldwin-Lima-Hamilton Corp., Philadelphia 144
Ballymore Co., Bryn Mawr, Pa. 140
Barber-Greene Co., Aurora, Ill. 602
Barrett-Cravens Co., Chicago 1350, 1449
Basco Mfg. Co., Stamford, Conn. 1833
Bassick Co., Bridgeport, Conn. 906
Beacon Machinery Inc., East St. Louis, Ill. .. 815
Industrial Div., Belt Corp., Orient, O. 434, 436, 438
Benbow Mfg. Co., Burlingame, Calif. 1500
Benton Harbor Engrg. Works, Benton Harbor, Mich. 1807
Berg-Gibson Mfg. Co., Kansas City, Mo. .. 439, 441
Better Packages Inc., Shelton, Conn. 502
Big Joe Mfg. Co., Chicago 1434
Bond Foundry & Mach. Co., Manheim, Pa. .. 805
Bowers Battery & Spark Plug Co., Reading, Pa. 1023
Brainard Steel Div., Sharon Steel Corp., Warren, O. 621
Brooks Equip. & Mfg. Co., Knoxville, Tenn.. 1028
Brown-Line Corp., Beverly Hills, Calif. 528
Buda Co., Harvey, Ill. 202, 1425
Burroughs Mfg. Co., Div. of American Metal Products Co., Detroit 832, 834
E. W. Buschman Co., Cincinnati 319, 321
Butler Bin Co., Waukesha, Wis. 825

C. & D. Batteries Inc., Conshohocken, Pa. 432
C. I. T. Corp., New York 913
Calabar Corp., South Gate, Calif. 535
Cambridge Wire Cloth Co., Cambridge, Md.. 811
Century Products Co., St. Louis Park, Minn... 1823
Chain Belt Co., Milwaukee 1812
Chicago Tramrail Corp., Chicago 333
R. H. Chilton Co., Nashville, Tenn. ... 239, 241
Chisholm-Moore Hoist Corp., Columbus McKinnon Chain Corp., Tonawanda, N. Y. 1526
William Christensen Co., York, Pa. 1809
City Machine & Wheel Co., Akron, O. 1542
Clark Door Co., Newark 141
Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich. ..... A, B, 1600
Cleveland Crane & Enginering Co., Wickliffe, 1325-A
Clinch-Tite Pallet Co., Boston 336
Clyde Iron Wks. Inc., Duluth, Minn. 312
Coffing Hoist Co., Danville, Ill. 407
Coles Cranes Inc., Joliet, Ill. 1333-B
Colson Corp., Elyria, O. 1239
Colson Equip. & Supply Co., Los Angeles ... 837

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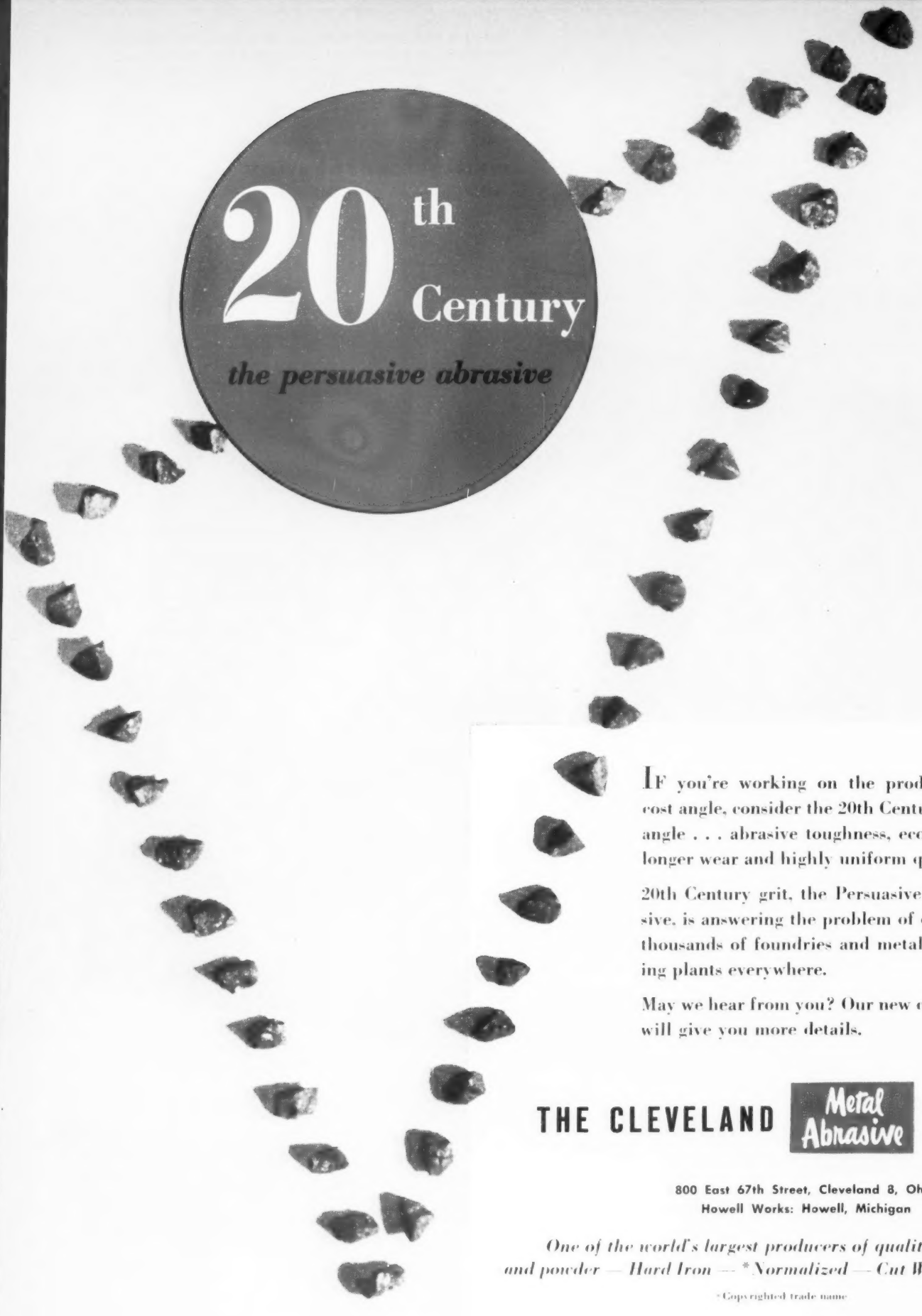

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Foundry Statistics

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1950	920,502	512,192	.....
1951	1,085,241	656,076	.....
1952			
Jan.	87,003	54,988	202,799
Feb.	82,898	50,129	193,061
Mar.	80,960	49,084	196,896
Apr.	89,270	56,337	198,215
May	81,770	51,476	180,382
June	74,446	46,511	173,353
July	45,266	29,675	166,517
Aug.	63,716	39,308	162,832
Sept.	75,950	45,849	168,367
Oct.	88,062	52,922	168,609
Nov.	76,099	46,708	167,842
Dec.	80,680	50,485	173,494
Total	926,120	573,472	.....
1953			
Jan.	87,249	53,272	174,809

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1950	543,082	184,782	181,366	167,201	.....
1951					
Dec.	40,907	16,202	11,262	10,891	110,249
Total	550,433	206,671	172,729	157,756	.....
1952					
Jan.	46,424	18,051	12,236	13,884	109,654
Feb.	44,847	17,451	13,445	13,012	110,327
Mar.	46,448	19,017	13,673	12,880	104,749
Apr.	49,824	19,451	14,631	14,482	104,004
May	47,752	18,317	14,292	13,907	100,802
June	45,310	18,452	11,982	13,860	103,685
July	40,091	16,342	10,866	12,341	106,673
Aug.	46,761	18,477	12,397	12,884	112,852
Sept.[3]	45,430	16,733	12,515	15,888	127,777
Oct.[3]	51,631	17,826	15,191	18,284	132,624
Nov.[3]	46,483	15,419	13,463	17,372	138,461
Dec.[3]	53,349	17,283	16,191	19,608	146,485
12 mo.[3]	564,350	212,819	160,882	178,402	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Unfilled Orders[2]
1950	1,056,973	953,590	55,614	.....
1951				
Dec.	80,259	72,813	4,958	80,294
Total	1,177,541	1,056,226	69,943	.....
1952				
Jan.	89,616	80,376	6,233	78,316
Feb.	86,231	77,813	5,204	75,279
Mar.	88,642	79,437	6,182	72,463
Apr.	84,460	75,590	5,914	70,602
May	81,903	73,723	5,420	70,252
June	75,359	67,748	4,858	70,797
July	64,762	58,931	3,637	74,739
Aug.	77,094	69,754	5,106	73,928
Sept.[3]	85,815	78,278	4,680	89,034
Oct.[3]	93,102	84,544	5,518	86,779
Nov.[3]	80,439	72,281	5,011	82,393
Dec.[3]	90,799	81,777	5,715	76,871
12 mo.[3]	998,222	900,252	63,478	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1950	15,224	13,310	.....
1951			
Dec.	2,916	2,525	14,729
Total	33,135	28,596	.....
1952			
Jan.	3,569	3,083	14,047
Feb.	3,368	2,940	14,459
Mar.	3,319	2,972	13,279
Apr.	3,051	2,751	13,244
May	3,002	2,698	13,041
June	2,948	2,699	12,094
July	2,654	2,393	12,948
Aug.	2,722	2,486	13,178
Sept.[3]	3,090	2,949	16,833
Oct.[3]	3,250	3,070	16,237
Nov.[3]	2,959	2,785	17,053
Dec.[3]	3,110	2,872	16,020
12 mo.[3]	37,042	33,698	.....

Foundry Production Workers

Estimated Number

	Dec. 1952	Nov. 1952	Dec. 1951
Ferrous	240,400	238,800	247,700
Nonferrous	103,800	100,800	91,900

Average Weekly Earnings

Gray Iron	$75.73	$74.04	$69.84
Malleable Iron	78.48	77.07	72.85
Steel	83.56	81.17	78.75
Nonferrous	84.02	81.99	78.24

Average Weekly Hours

Gray Iron	41.7	41.0	41.3
Malleable Iron	41.9	40.8	41.3
Steel	42.7	42.1	43.7
Nonferrous	43.0	42.2	42.8

Labor Turnover Rate (Dec.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	3.5	2.9	2.0	0.3
Malleable Iron	4.3	3.2	1.9	0.3
Steel	3.3	2.7	1.7	0.4
Nonferrous	4.5	4.1	2.6	0.5

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Chilled Railroad Car Wheels—For Sale	Pressure Pipe & Fittings Total[4]	Soil Pipe & Fittings Total[4]	Unfilled Orders[2]
1950	12,905,562	6,880,352	8,117,748	3,415,281	2,308,661	1,043,590	514,074	456,402	1,203,762	761,317	.....
1951	14,988,555	8,453,048	9,573,347	4,471,539	2,614,517	1,257,542	639,996	563,272	1,473,192	687,503	.....
1952											
Jan.	1,199,285	694,498	745,548	359,806	225,704	110,263	57,155	53,551	125,729	45,149	1,800,905
Feb.	1,155,143	654,833	733,067	348,855	219,251	105,918	50,444	47,649	107,669	44,712	1,766,434
Mar.	1,172,017	660,920	723,225	334,492	228,799	110,607	53,919	49,747	115,843	50,231	1,711,037
Apr.	1,204,801	652,962	773,538	344,121	204,805	85,239	48,506	42,650	117,929	60,023	1,614,426
May	1,100,630	620,049	698,332	317,150	186,998	91,980	44,229	39,848	117,586	53,485	1,459,305
June	835,263	502,322	616,895	292,846	19,467	10,575	44,066	44,066	103,335	51,500	1,445,521
July	636,141	431,889	427,475	227,794	14,794	10,223	40,783	40,783	96,784	56,305	1,409,684
Aug.	1,001,629	602,025	596,369	295,861	198,816	99,760	35,606	35,606	108,313	62,485	1,513,166
Sept.	1,119,373	625,680	676,732	309,299	230,219	107,987	39,912	35,884	107,847	64,663	1,450,723
Oct.	1,233,480	684,321	759,131	340,695	243,462	117,255	45,664	41,148	117,089	68,134	1,391,609
Nov.	1,060,735	590,334	649,316	296,674	218,349	104,035	41,655	38,210	99,196	52,219	1,309,252
Dec.	1,141,658	619,070	713,332	321,939	247,605	116,410	42,957	42,957	95,198	42,566	1,316,308
Total	12,860,155	7,338,903	8,112,960	3,792,532	2,238,269	1,070,252	544,896	512,099	1,312,518	651,472	.....
1953											
Jan.	1,161,945	622,392	730,216	324,330	252,181	118,514	38,385	38,385	93,930	47,233	1,333,255

Steel Castings—Shipments

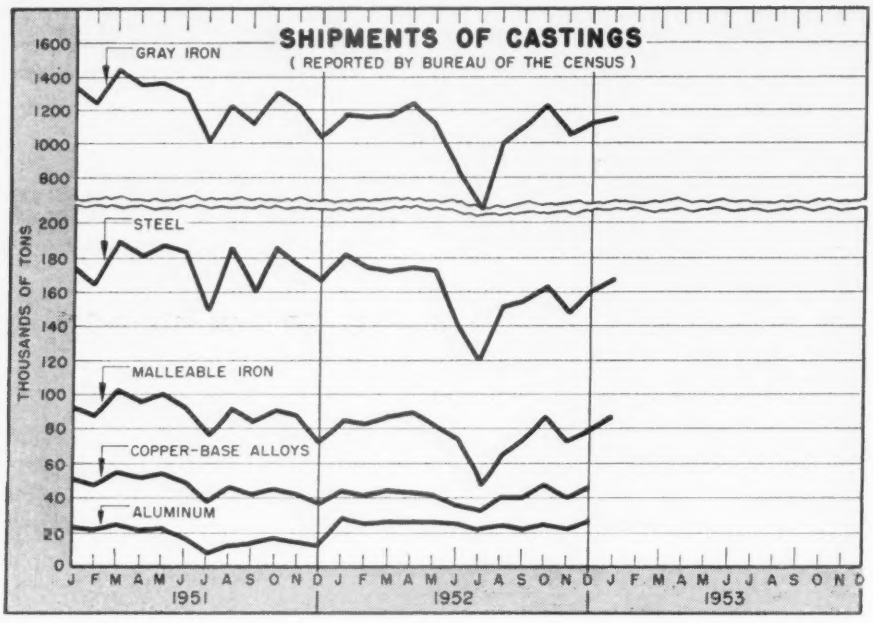
(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[2]
1950	1,459,382	1,042,884	261,357	1,081,162	788,619	243,215	379,220	254,265	18,142	.....
1951	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
Jan.	183,738	139,488	37,091	133,985	102,265	31,806	49,753	37,223	5,285	869,299
Feb.	174,626	133,602	31,719	125,484	94,969	28,251	49,142	38,633	3,468	856,872
Mar.	173,694	131,997	32,118	125,787	95,206	27,782	47,907	37,196	4,336	857,115
Apr.	175,075	134,325	33,549	126,628	97,128	29,798	48,447	37,654	3,751	842,970
May	173,635	132,129	35,227	125,309	95,816	30,995	48,326	37,129	4,223	804,695
June	141,628	114,410	30,455	101,850	84,388	26,815	39,778	30,818	3,640	846,459
July	119,036	97,633	20,752	81,576	67,600	18,694	37,460	30,329	2,058	855,046
Aug.	150,232	113,997	24,498	107,203	80,877	21,626	43,029	33,120	2,872	809,354
Sept.	158,392	121,402	20,686	109,011	82,557	17,843	49,381	38,845	2,843	781,929
Oct.	165,155	124,626	23,590	116,201	86,584	20,611	48,954	38,042	2,979	772,949
Nov.	148,259	110,467	23,148	105,314	77,528	20,681	42,945	32,939	2,467	751,687
Dec.	161,733	122,166	26,728	114,146	85,809	24,046	47,587	36,357	2,682	719,208
Total	1,925,203	1,476,242	339,561	1,372,494	1,050,727	298,948	552,709	428,285	40,604	.....
1953										
Jan.	167,211	126,819	27,150	118,423	118,423	24,788	48,788	38,121	2,362	706,490

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures. [4] All cast iron pipe is shipped for sale.

(Concluded on page 188)

FOUNDRY STATISTICS (Concluded from page 187)



Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1952	1953
Jan.	404.5	301.0
Feb.	200.4	257.3
Mar.	310.0	....
Apr.	385.1	....
May	225.2	....
June	353.8	....
July	343.9	....
Aug.	311.6	....
Sept.	365.9	....
Oct.	335.8	....
Nov.	258.1	....
Dec.	343.3	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Ingot Brass and Bronze

(Shipments in net tons)

	1952	1953
Jan.	28,315	24,423
Feb.	24,211	25,429
Mar.	23,890	.....
Apr.	22,547	.....
May	21,740	.....
June	21,274	.....
July	18,947	.....
Aug.	21,807	.....
Sept.	22,770	.....
Oct.	25,811	.....
Nov.	23,441	.....
Dec.	22,983	.....
Total for year	277,736	.....

Zinc-Base Alloy

(Shipments of casting[2]—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1950	579,332	376,681	.....
1951			
Dec.	26,998	17,028	77,308
Total	494,950	328,183	.....
1952			
June	33,829	21,433	60,719
July	23,462	16,055	57,666
Aug.	29,955	18,794	57,373
Sept.[3]	35,119	24,220	75,976
Oct.[3]	42,852	30,437	78,984
Nov.[3]	36,765	25,740	77,081
Dec.[3]	42,148	29,309	85,767
12 mo.[3]	424,634	283,563	.....

Coke Production and Consumption

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1951	79,133,744	78,868,124	3,664,404
1952			
Feb.	6,355,151	6,411,905	251,125
2 mo.	13,156,804	13,171,916	512,273
Mar.	6,779,639	6,743,944	264,488
Apr.	5,806,153	5,770,711	261,972
May	5,961,757	5,882,713	253,605
June	2,472,940	1,772,203	219,909
July	2,376,019	1,621,308	166,377
Aug.	6,039,749	6,204,539	232,249
Sept.	6,180,804	6,517,682	269,029
Oct.	6,449,519	6,792,273	276,427
Nov.	6,316,660	6,418,639	252,805
Dec.	6,690,649	6,981,036	246,107
Total	68,230,693	67,876,964	2,955,241
1953			
Jan.	6,767,814	6,884,585	248,557
Feb.	6,134,175	6,265,422	237,006
2 mo.	12,901,989	13,150,007	485,563

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1951	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
Feb.	5,701.8	245.2	261.4	4,496.9	698.3	5,139	441	29	11
2 mo.	11,661.1	478.3	547.2	9,169.2	1,431.4	10,591	907	58	25
Mar.	6,226.2	250.3	273.1	4,895.9	806.9	5,552	433	27	7
Apr.	5,170.0	243.8	218.5	4,069.9	638.0	4,714	446	28	8
May	5,414.2	245.4	236.0	4,295.6	637.2	4,823	412	25	8
June	1,043.2	133.7	103.1	758.6	47.7	991	342	20	5
July	981.6	119.7	118.3	712.9	30.7	845	250	12	8
Aug.	5,767.3	262.9	280.6	4,553.8	669.9	5,063	423	9	8
Sept.	6,069.3	294.7	306.6	4,757.0	710.9	5,363	417	21	9
Oct.	6,415.3	280.0	299.4	5,091.6	744.2	5,812	463	24	9
Nov.	6,138.9	262.0	315.4	4,842.6	718.8	5,472	397	21	12
Dec.	6,414.7	293.4	315.1	5,106.9	699.2	5,685	419	24	14
Total	61,306.8	2,864.2	3,013.3	48,254.0	7,174.9	54,911	4,909	269	113
1953									
Jan.	6,470.6	274.9	285.5	5,201.5	708.8	.....	.....	.....	.....
Feb.	5,802.6	187	294.6	4,640.7	680.3	.....	.....	.....	.....
2 mo.	12,273.2	461.8	580.1	9,842.2	1,389.1	.....	.....	.....	.....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap—Total	All Scrap—Purchased	By Types of Furnace—Cupola—Total	Cupola—Purchased	Air—Total	Air—Purchased	Electric—Total	Electric—Purchased
1950	61,497,000	29,403,000	9,471,000	4,666,000	1,118,000	407,000	6,385,000	3,828,000
1951								
Dec.	5,483,089	2,656,536	738,150	398,538	87,748	32,430	687,559	450,155
Total	68,518,208	33,822,431	11,090,607	5,878,939	1,203,740	441,099	8,391,919	5,389,005
1952								
Jan.	5,847,011	2,788,426	846,891	449,935	101,211	38,150	743,233	470,126
Feb.	5,572,506	2,702,092	789,293	419,279	94,900	35,536	697,319	440,325
Mar.	5,902,529	2,860,364	791,165	415,853	92,751	35,013	741,793	475,161
Apr.	5,360,417	2,657,926	834,066	440,035	106,059	38,888	684,318	427,339
May	5,369,258	2,660,471	779,436	404,899	94,597	35,966	700,617	455,460
June	2,048,951	1,169,102	719,739	374,127	82,357	30,412	285,596	173,740
July	1,965,007	1,156,296	524,651	278,750	52,999	19,733	364,536	244,944
Aug.	5,470,696	2,738,593	721,255	348,181	74,351	28,091	682,405	446,543
Sept.	5,782,986	2,862,994	760,092	389,910	82,212	30,493	761,795	501,602
Oct.	6,256,031	3,066,041	851,458	439,401	98,947	37,743	814,565	546,189
Nov.	5,960,435	2,885,008	731,825	379,950	80,228	30,502	780,042	518,320
Dec.	6,089,722	2,973,633	804,275	412,177	92,621	35,064	758,845	491,084
Total	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,833

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only. [3]Based on new sampling method; not comparable to prior figures.

Tapping one of the AJAX furnaces. Metal runs by gravity into a bull ladle. About 400 lbs. are poured at a time. Now read the story.

How a small foundry MELTS IRON FOR MALLEABLE CASTINGS, and does it easily and economically in an AJAX-WYATT ELECTRIC FURNACE

"How can a medium size foundry melt iron for malleable castings at minimum cost, and still maintain optimum uniformity in quality?" Mr. Curtis Pollock, Plant Superintendent of the I. F. Sales Co., Inc., asked himself this question. His company produces malleable castings, and Mr. Pollock, like hundreds of other plant superintendents, wanted to explore new methods in search of conveniences and economies. Boldly he plunged into a new field—the field of low-frequency induction melting for malleable iron castings. Naturally, he ran into trouble: he experienced defeat, expense and failure. Eventually, however, he came up with a solution that may work something of a revolution in ferrous melting practice.

WORRIED ABOUT LINING

He decided to install one single-phase, 525-550 V, low frequency AJAX-WYATT furnace of 350-400-kw capacity to be used for holding, super-heating or duplexing. It was not purchased for melting; the makers themselves were uncertain as to the life of linings in ferrous melting, but Mr. Pollock wished to test his theories. To their collective amazement, experience has shown, when the furnace is used for melting, a lining life of approximately three months; that condition obtained when the furnace operated 24 hours a day, six days a week.

Melting in the first AJAX-WYATT furnace proved so satisfactory that two duplicate furnaces were ordered, and all three have now been in almost constant use for several months. They run 24 hours a day, six days a week, and do all the melting required in the foundry managed by Mr. Pollock. Over weekends the induction furnaces are switched on to standby settings in which current consumption is set and held so that input balances heat losses. Metal remaining in the furnaces remains at fixed temperatures until pouring is about to be resumed.

AN IMPRESSIVE "FIRST"

Charge losses are negligible and never have been found to exceed 0.200% carbon. Slag is skimmed off only once a week. If the power fails, metal will remain molten for about three hours.

Mr. Pollock was very enthusiastic about his low-frequency induction melting for malleable iron castings, an enthusiasm we share. As makers of the AJAX-WYATT electric furnace, we were particularly pleased to learn that our product contributed toward his success. They are the first of this type to be used in production ferrous melting in this country. We enter here some of Mr. Pollock's findings, in the belief that other foundrymen might read them with interest:

REMARKABLE FINDINGS

It requires only four men per shift to operate the three furnaces, fill ladles, and do the pouring. Operating and maintenance costs are low, and quality of melts is easily held uniform. Relining can be done by two men in about 14 hours, and drying can be done in three days by a gas flame.

Following is an estimated cost per ton of melt based on operation 24 hours per day, five days a week, and with total power cost of 1c per kwhr. (Naturally, all costs vary slightly with local conditions.)

Power	**$5.00 to**	**$5.50**
Holdover power	**.48**	**.48**
Labor	**2.60**	
Refractory	**1.75**	
Total	**$9.83**	**$10.33**

That's the story, in the briefest outline. If you have some questions, we will do our best to answer them. Simply write today to

AJAX ELECTRIC FURNACE CORPORATION

1108 FRANKFORD AVE., PHILADELPHIA 25, PA.

Associated Companies
AJAX Electro Metallurgical Corporation
AJAX Electrothermic Corp.
AJAX Electric Co., Inc.
AJAX Engineering Corp.

Representatives from FEF schools at the conference included, top row, left to right: D. S. Eppelsheimer, Missouri School of Mines; C. M. Adams, MIT; Fred Westermann, University of Cincinnati; R. A. Flinn, University of Michigan; D. C. Ekey, Pennsylvania State College; Clyde McQuiston, Ohio State University. Bottom row: W. C. Jeffrey, University of Alabama; L. F. Mondolfo, Illinois Institute; C. C. Sigerfoos, Michigan State; Philip Rosenthal, University of Wisconsin, and C. T. Marek, Purdue

PROGRESS IN FEF PROGRAM REVIEWED

REPRESENTATIVES of both industry and technical universities participated in the annual advisory committee conference held by the Foundry Educational Foundation in Cleveland, Mar. 11-12. From the standpoint of both attendance and interest, the 1953 conference was one of the best yet held under FEF sponsorship.

The first session was devoted to problems of the foundry industry in applying more engineering talent to the production of castings. M. J. Allen, director of personnel and public relations, American Steel Foundries, Chicago, and president of the foundation, presided at the session.

Frank G. Steinebach, editor, FOUNDRY, stated that while steady progress in mechanization has been under way for the last 50 years, the greatest developments have taken place since 1940. Various factors have contributed to this movement, including the demands of war for more and better castings, the shortages of manpower, and an awakening on the part of the foundry industry. The various trade associations have contributed greatly to this growing desire to improve the markets for cast products.

Much of this progress has been made possible because science and engineering have replaced the crafts in the development of equipment and the operation of foundries. Present state of development plus future growth in demand for castings, as indicated by studies of the industrial trends of the country by several agencies, point to an ever growing need for engineers of all types in the foundry industry. Future of the industry depends on the type of men now entering the industry.

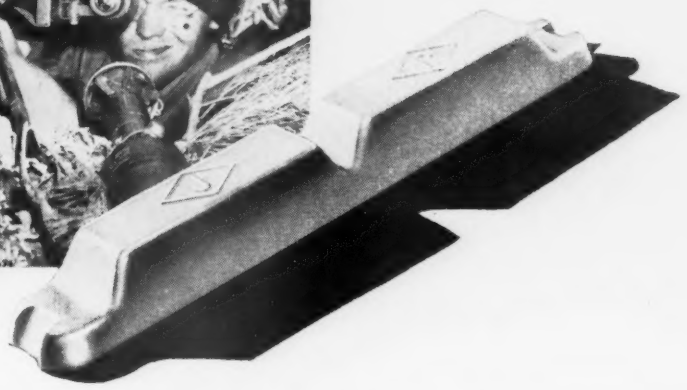
Mr. Steinebach indicated that we need men of vision, men who believe in the industry, men not hampered

(*Continued on page* 192)

Luncheon scene on opening day of the recent Foundry Educational Foundation conference in Cleveland

U. S. Army Photograph

SPECIFICATIONS
MIL-A-10935-6-7



96 FOOT POUNDS IMPACT WITH NO FRACTURE

ALMAG 35

ALUMINUM ALLOY

withstands Extreme Test on 3/16" Wall Section

In order to pass the "Guillotine" test, bazooka barrels permanent-mold cast of Almag 35, supported on wedges, must withstand the impact without fracture of an 8 lb. steel ball dropped 12 feet.

Such performance is proof that Almag 35 excels all known Aluminum casting alloys for impact resistance strength.

A series of tests on *machined sections* of these production barrels showed Tensile Strength from 35,250 to 39,138 psi.; Yield Strength 19,488 to 20,373 psi.; and Elongation 12–15%.

Before you specify ANY alloy, ask for ALMAG recommendations.

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WILLIAM F. JOBBINS INCORPORATED

AURORA P. O. BOX 230 **ILLINOIS**

Conference participants included: Top row—C. C. Sigerfoos, Michigan State; H. F. Taylor, MIT; D. C. Williams, Ohio State; Fred Westermann, University of Cincinnati. Second row—I. R. Wagner, president, AFS; C. A. Barnett, secretary-treasurer, FEF; C. B. Schneible, past president and trustee, FEF. Third row—Conference speakers C. W. Briggs, Steel Founders' Society; F. G. Steinebach, *Foundry;* W. S. Williams, Lynchburg Foundry Co. Bottom row—M. J. Allen, president of the FEF; G. K. Dreher, executive director, FEF; Dr. J. T. MacKenzie, vice president, FEF; Thomas Kavery Jr., Herman Pneumatic Machine Co., Pittsburgh

(*Continued from page* 190)

by tradition, and who are eager to apply the best engineering methods. Securing such men requires close cooperation between industry and the technical universities.

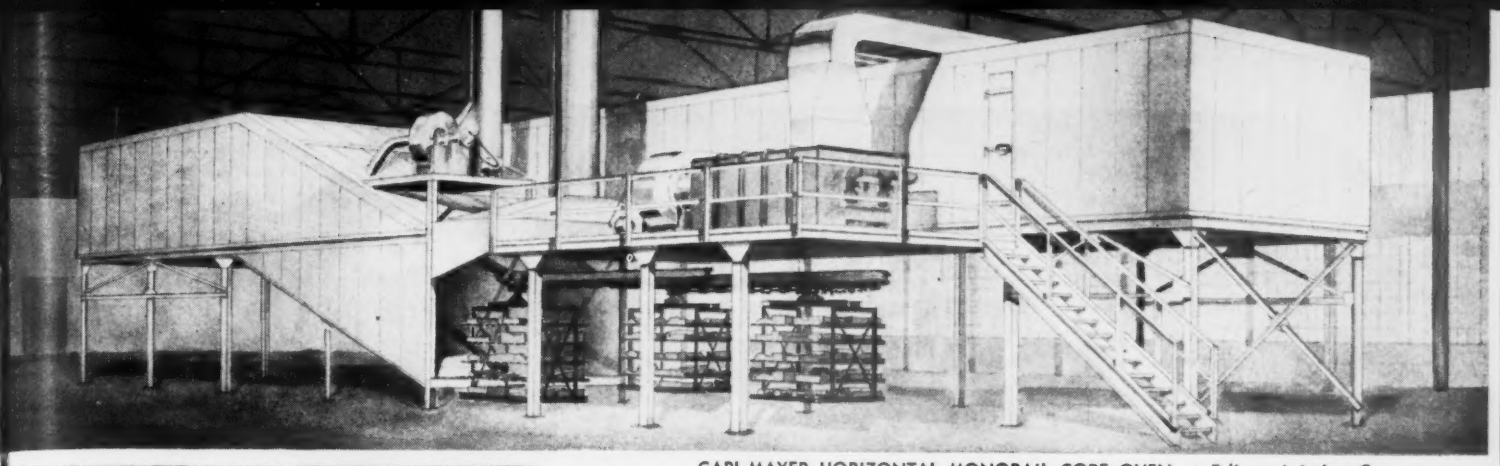
A panel discussion on "Use of Engineering Talent in the Foundry Industry" developed a number of interesting slants on the types of engineers needed by foundries. Charles W. Briggs, technical and research director, Steel Founders' Society of America, Cleveland, discussed the metallurgical engineer. Mr. Briggs said that since the foundry industry basically is a metals industry, a metallurgical engineer should be employed in those small plants which have only one engineer. A number of small foundries having only one engineer scatter his responsibilities in production, sales and quality control. In the steel foundry industry, most foundries producing over 100 tons and upward to 750 or 1000 tons a month, employ a metallurgist and in some cases an assistant metallurgist.

Discuss Engineering Activities

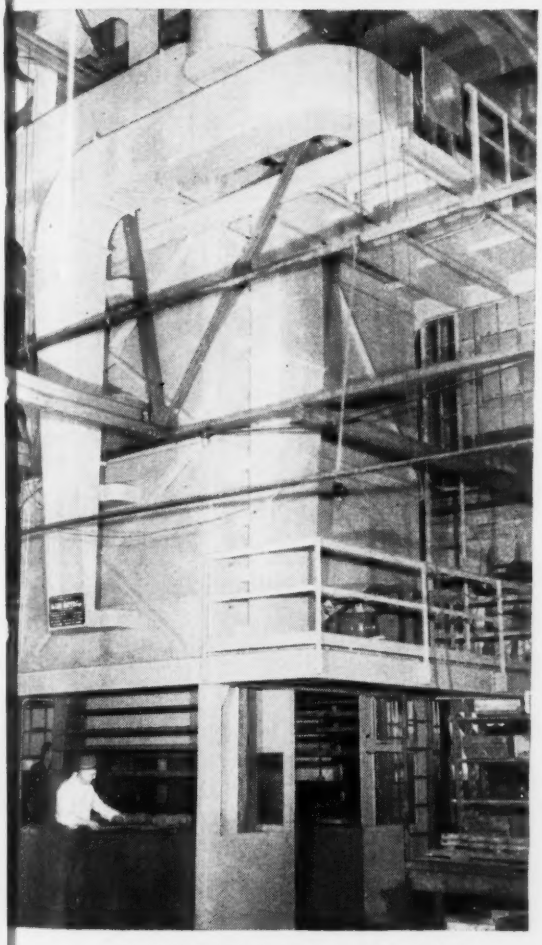
Mr. Briggs stated that the metallurgists in the average steel foundry should be concerned with the entire problem of quality control of the product. To accomplish best results, the metallurgist's immediate superior should have a rank equivalent to a vice president of either production or sales. The speaker then discussed in detail the responsibilities which should be assigned the metallurgical engineer in providing quality control. In conclusion, he stated that there is an important need in the foundry industry for metallurgical engineers who understand the comprehensive nature of quality control of the product, and who will work with that end in view.

In discussing the mechanical engineer, B. J. Yearley, assistant manager, National Malleable & Steel Castings Co., Cicero, Ill., referred to the time not too many years ago when it was not advisable for an operating man in the foundry to admit being a college graduate. Men in the shop were artisans who had learned their business the hard way and believed the college-trained man should acquire his knowledge of foundry practice in the same manner. But over the years this attitude has changed, because the engineer, by developing better materials and equipment, has demonstrated that he can make the job of the workman much easier.

(*Continued on page* 195)



CARL-MAYER HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co.
Patent No. 2355814

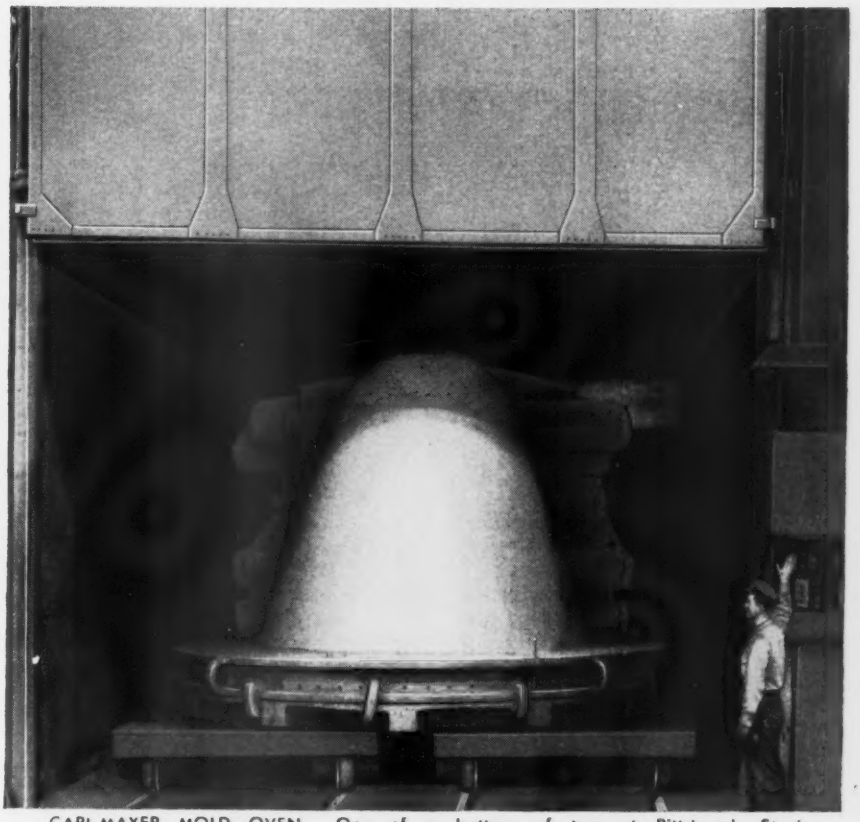


CARL-MAYER VERTICAL CORE OVEN
at G. & C. Foundry Company
Patent No. 2257180.

"BIG" Engineering brings big foundry oven jobs to CARL-MAYER

Carl-Mayer designs embody patented features which contribute to highest efficiency and economy in operation. It will pay you to consult us on your next core baking and mold drying problem. We build ovens of all types and sizes, also other types of industrial ovens and furnaces.

Write For Bulletin No. 53-CM.



CARL-MAYER MOLD OVEN. One of a battery of two at Pittsburgh Steel Foundry Corp. Capacity: 100 tons per charge (each oven). PATENT APPLIED FOR.

CARL-MAYER CORE AND MOLD OVENS ARE SERVING CONCERNS LIKE THESE:

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ctric Autolite Co.
d Motor Co.
mont Foundry Co.
& C. Foundry Co.
neral Electric Co.
neral Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Golden Foundry Co., Inc.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
Mesta Machine Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co. (U. S. Steel Corp.)
Packard Motor Car Co.
Pittsburgh Steel Foundry Corp.
H. B. Salter Co.
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A. C. Williams Co.
Whiten Machine Works
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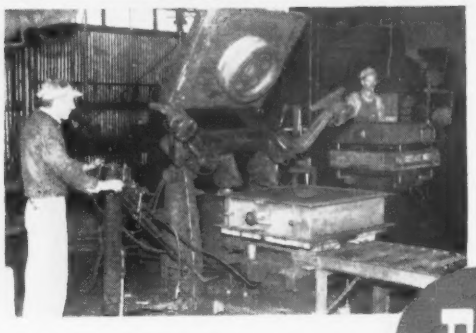

Davenport installation of Roll-Over molding machine and Jolt Stripper making cope and drag on same job.

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Le-Roi, Rue Paul Carle, Seine, France

(*Continued from page* 192)

While Mr. Yearley conceded that metallurgical engineers have demonstrated their ability to assist the foundry in producing a better product at a lower cost, mechanical engineers also are needed. Increase in the use of material handling equipment, and the application of machines to all phases of castings production, have brought about the need of a foundry engineer trained in mechanics. The foundry engineer probably could use training in other fields, such as ceramics and physics. But regardless of his particular engineering training, Mr. Yearley believes that the individual will be a successful foundry engineer if he has learned to think in terms of basic scientific principles.

W. S. Williams, works simplification director, Lynchburg Foundry Co., Lynchburg, Va., speaking on the industrial engineer, described in some detail how his organization uses industrial engineers. Working as a group in staff capacity, these engineers work on a project basis on problems developed by officers on the various departments of the company, develop standards, and undertake work simplification.

Industrial engineers joining the organization spend a year to 18 months in the various departments of the foundry in the same program as provided for other engineers. At the end of this training, some time is spent specializing in the engineering groups.

Many projects are undertaken on such problems as plant layout, materials handling, methods engineering, cost analysis, equipment surveys and office procedure analysis. Mr. Williams outlined a number of jobs that had been tackled by the industrial engineering groups, and indicated the results. In conclusion, he stated that the industrial engineer can do better without a limit on his field of operation.

E. N. Baldwin, student recruitment, Educational Department, Westinghouse Electric Corp., Wilkinsburg, Pa., discussed a report of the Advisory Committee of the Relations with Industry Division, American Society for Engineering Education, of which he is chairman. The report deals with a description of engineering positions in industry for the guidance of engineering students. The report discusses engineering positions in industry, including foundry; engineers in design and development; engineers in manufacturing; engineers in sales, and yardsticks for selection of engineering graduates for employment. The report includes much of interest to those charged with securing engineers for work in the foundry industry.

Recruiting and training of engineers was discussed at the Wednesday afternoon session, presided over by Thomas Kaveny Jr., president, Herman Pneumatic Machine Co., Pittsburgh.

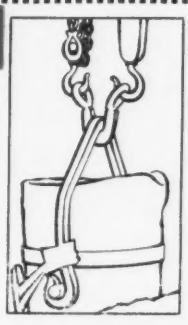
Speaking on "What Is Engineering Education?" Dean Eric Walker, School of Engineering, Pennsylvania State College, pointed out that the heart of engineering is the use of materials and machines to create

(*Continued on page* 198)

How To Do It . . .

Two-Way Ladle Transfer Hook

By HENRY F. BROWN
Assistant Superintendent
Golden Foundry Co.
Columbus, Ind.



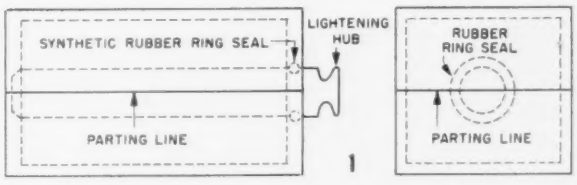
TRANSFERRING of ladles carried on an overhead monorail is facilitated greatly by the unique hook shown in the accompanying diagram. This two-eyed gimmick helps in the sure, safe transfer of a ladle from the carrier to the pouring floor or from one crane to another, by permitting the hook of one crane to engage an eye of the transfer hook while the ladle is suspended from a second crane by the other eye of the transfer hook.

Ideas on Core Wires and Rods

By LAWRENCE D. PRIDMORE
President
International Molding Machine Co.
La Grange Park, Ill.

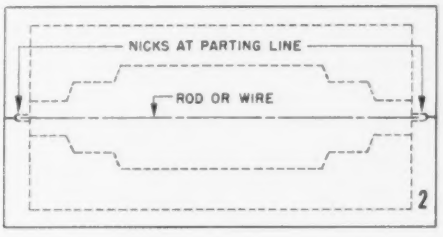
WHENEVER a vent rod or lightening hub is to be inserted in a corebox used on a blower, an O-type synthetic rubber ring makes an efficient seal to prevent air leakage and form an effective lock in preventing the hub from blowing out. As shown in Fig. 1, both the plug and the corebox are grooved to form a recess for the ring. Resiliency of the rubber permits the hub to be withdrawn when the core is to be removed from the box.

Fig. 2 shows an idea helpful in eliminating stools in a corebox to hold strengthening wires or rods in place. Place a nick in the ends of the corebox at coreprint spots. The nicks should be of such size that the wire or rod fits into them snugly but easily. Set the wire or rod in the nicks, close the



box, then blow the core. The practice will save patching or mudding of the cores.

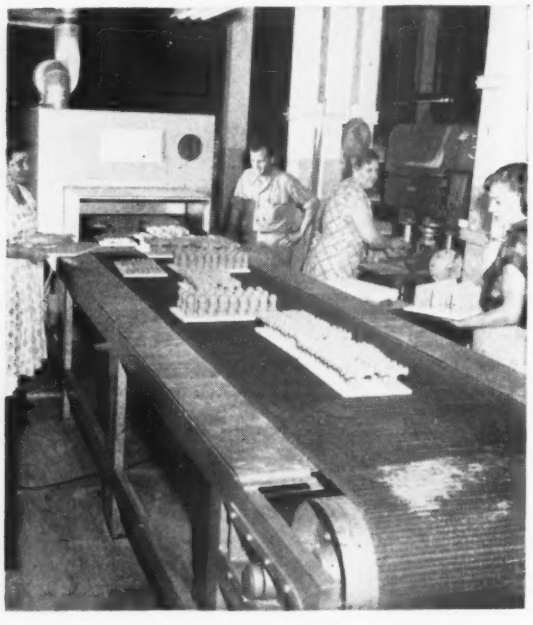
Care must be taken, however, to build up the mold pattern at the proper points so that impressions will be made in the mold to accommodate the ends of the strengthening wire or rod, otherwise there will be a crush when the mold is closed.



Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $10 for each idea submitted and published. Send a photo or drawing with your idea

Here's proven performance... FASTER

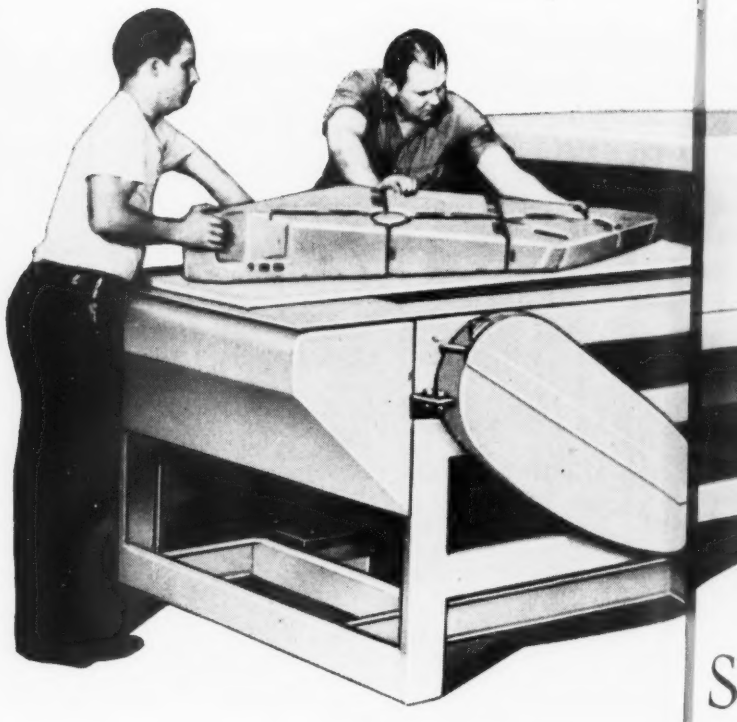
This foundry's productivity went up when conventional ovens were replaced by this modern equipment. Baking time was reduced and employee working conditions improved. The work area is now cool, and cores can be finished and inspected immediately after baking . . . no cooling period required.



This unit running at half capacity reduced core-baking costs 46% in this installation. Thus, production rate at this plant can now be doubled without adding further equipment, increasing cost, or using more floor space than before.

YES...you can use METAL CORE PLATES!

Techniques employed on THERMEX High Frequency Dielectric equipment for Core-baking permit the use of regular metal core plates *without* the need for *any* auxiliary heat.



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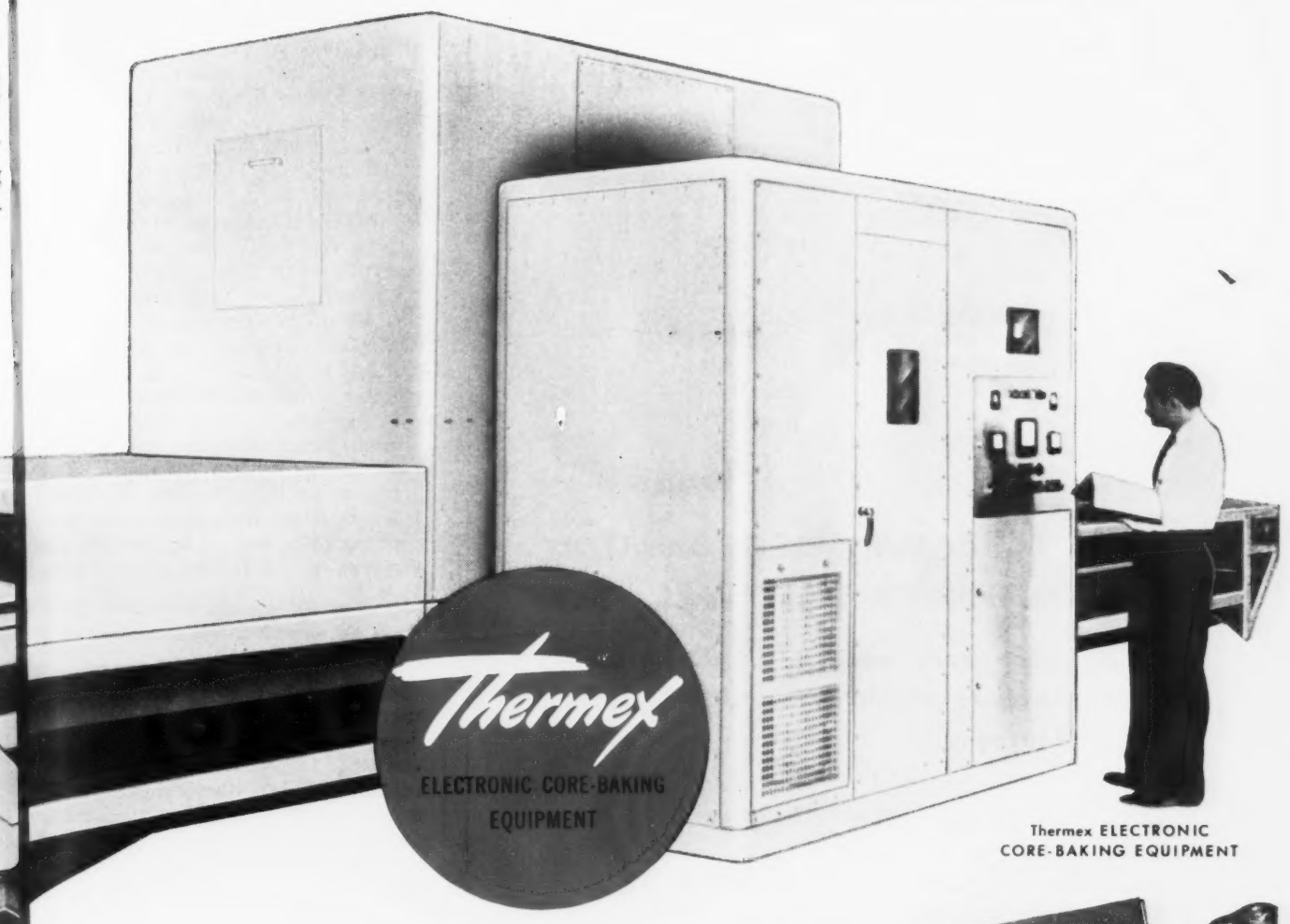
CORE-BAKING AT LESS COST!



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CORE-BAKING EQUIPMENT

SPEED IS IMPORTANT OF COURSE, and it will result in lower costs if it can be achieved together with more uniform cores, with fewer rejects and with improved dimensional stability. Authorized studies in leading foundries using THERMEX* Core-baking equipment show faster baking with greater core room yields.

A new THERMEX booklet will bring you up to date on the cost savings possible. It presents detailed engineering economy studies of various installations. Comparative cost figures, and answers to questions most commonly asked about electronic core-baking are included.

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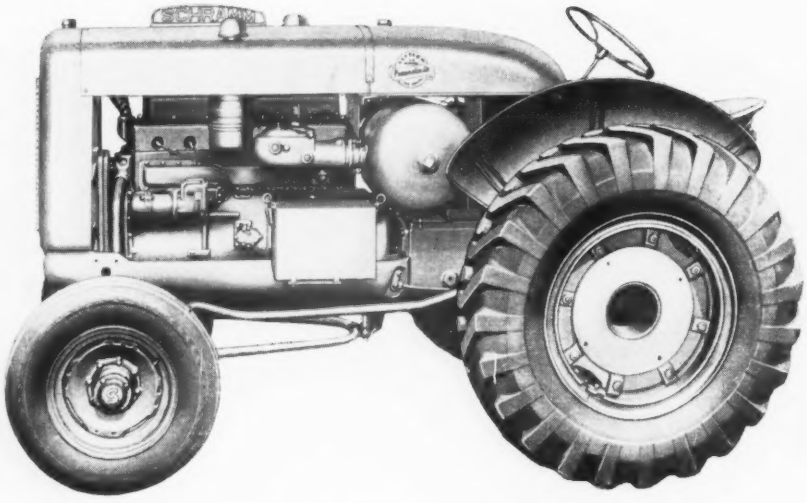

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Replace 2-man crane scoop . . . scooping sand into windrows to enable sand cutter to come along and cut sand.

- ***PUSH*** anything a wheel tractor will.
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- ***POWER*** anything a wheel tractor will.
- ***PROVIDE AIR*** for tools to be used on down days for plant maintenance, Paint Spraying, etc. Also for emergencies for operating Chipping Hammers in case of plant breakdowns.

All combined into a self-propelled unit that can easily be maneuvered around in limited floor space and other equipment.

WRITE TODAY FOR BULLETIN NEU-53

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

(*Continued from page* 195)

something new. However some jobs without creative opportunities are being filled by engineers, and one of the future trends in engineering education may be to develop more technicians. Dean Walker added that divisions between different engineering groups—mechanical, chemical, metallurgical, etc—are breaking down, and that a more general type of an engineer may supersede the specialized individual in the future.

F. Lynn Cason, co-ordinator of placement, Purdue University, offered these suggestions to companies interviewing students on employment:

The interviewer should be able to give all information requested of him, and should attempt to make the student a friend of the company whether or not the individual is hired.

Don't make the interview a cross-examination. Limit the interviewing team to one or two persons.

Follow up the interview promptly. Have an understanding with the student as to how soon he will be advised as to the results of the interview.

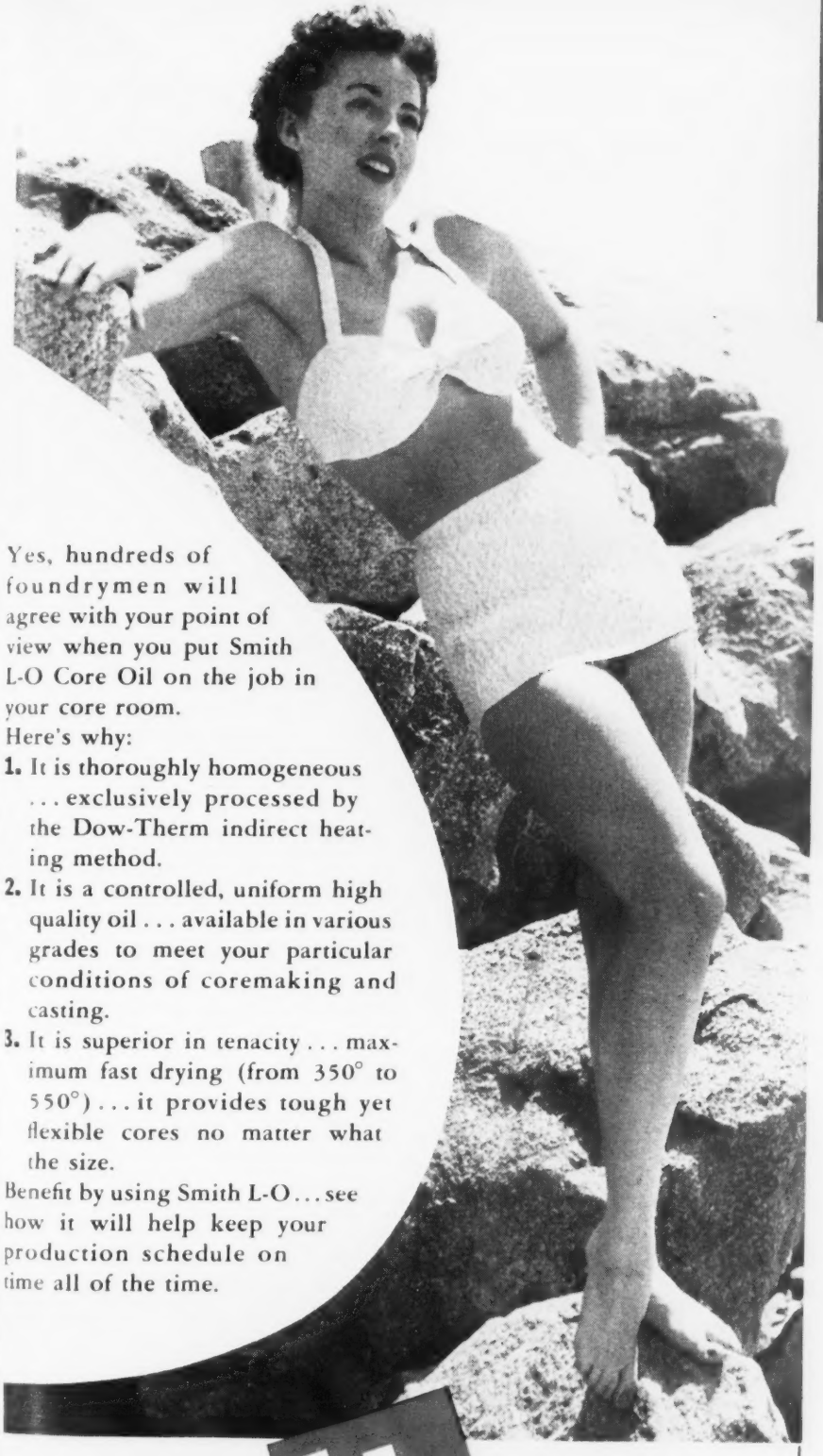
Summer Work Suggested

Mr. Cason recommended summer employment before graduation as a useful way for the company and prospective engineer to become acquainted. Experiences of companies regularly hiring young engineers indicate they spend from $200 to $1000 on their recruiting activities for each individual hired. Salaries being offered engineering graduates currently average $325 to $375 a month.

The first five years of a graduate engineer's association with a company is a critical period, it was stated by Karl McEachron, General Electric Co., Erie, Pa. The individual is not too well acquainted with either his new company or the industry itself, and a little personal attention to him can be important in determining if he will stick with the company and if he will continue in the engineering profession. Mr. McEachron discussed a manual developed by the Engineering Council for Professional Development which offers recommendations to management covering these first five years.

Speaking about his experiences as a young engineer with a small foundry, Robert W. Lundberg, Gibson & Kirk Co., Baltimore, emphasized that a broad knowledge of engineering can help the individual in becoming valuable to the foundry. The young engineer's usefulness stems from other phases of engineering training as well as from his knowledge of actual foundry work. Mr.

(*Please turn to page* 350)



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CORE OIL

Yes, hundreds of foundrymen will agree with your point of view when you put Smith L-O Core Oil on the job in your core room.

Here's why:

1. It is thoroughly homogeneous . . . exclusively processed by the Dow-Therm indirect heating method.
2. It is a controlled, uniform high quality oil . . . available in various grades to meet your particular conditions of coremaking and casting.
3. It is superior in tenacity . . . maximum fast drying (from 350° to 550°) . . . it provides tough yet flexible cores no matter what the size.

Benefit by using Smith L-O . . . see how it will help keep your production schedule on time all of the time.

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- MALCOLM G. STEVENS — Arlington, Massachusetts
- PACIFIC GRAPHITE CO., INC. — Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. — *(formerly M. W. Warren Coke Co.)* St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. — Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. — Portland 14, Oregon

Smith L-O *Core Oil*

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MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

Foundry Developments

By EDWIN BREMER

IN WHAT is claimed to be a new nickel plating process which requires no electrolytic equipment, the nickel is reduced by the use of hypophosphites, and provides a plate of nickel-nickel phosphide composition containing 5 to 8 per cent phosphorus. Developed by General American Transportation Corp., Chicago, the method is said to plate any article uniformly regardless of size or shape, and has proved satisfactory for production-line plating of steel, copper, brass, bronze, stainless steel and aluminum. Plate or coat is virtually nonporous, with excellent adhesion and a hardness of 550 to 650 Vickers. Other properties of the process, called "Kanigen," are said to be 102 per cent throwing power; minimum thickness within 10 per cent of average; excellent corrosion resistance in 20 per cent salt spray test; low ductility; coefficient of expansion 13 $\times$ 10^{-6} per degree C.

* * *

BROAD pattern of research programs has been set up by Alloy Casting Institute technical committees which ranges in scope from a fundamental study of corrosion to the development of new high-strength and high-temperature alloys. Looking toward future needs of high-alloy castings users, certain projects have been designed to increase fundamental knowledge of alloy structures and corrosion behavior. In addition, investigations have been planned with more immediate objectives. Results of the studies are expected to provide materials useful to designers in meeting expanded needs for higher operating temperatures and stronger materials of construction in modern industrial processes.

* * *

GRANT of $5000 for aid in the study of oxide film with a view to growing protective films on metals, has been made to Stevens Institute of Technology by the Research Corp. Project is described as the first attempt to use the electron microscope and electron diffraction simultaneously to study the growth and structure of oxide films. Eventual objective of the work is to develop methods of producing oxide films which will protect metals from corrosion. Zinc and aluminum will be studied first with the prospect of studying iron and steel when techniques are perfected. Aspects to be studied include discontinuities, cracks, wrinkles, and their location in relation to the original surface.

* * *

INVESTIGATION on "Pinholing and Boiling in Enameled Light-iron Castings," by E. Holland and presented in the March 5 issue of *Foundry Trade Journal,* indicates that pinholing can be reduced to a considerable extent by steady pouring, use of hot metal and smooth-flowing runners. Boiling appears to be caused by sulphur pickup on the skin of the casting, the sulphur being contained in the soot from partially burned coal dust in the molding sand. Filing or grinding about 0.002-in. from the surface of the casting seems to eliminate boiling effect. Shot blasting does not appear to remove the deleterious layer.

RECENTLY published 1952 annual report of the Armour Research Foundation of Illinois Institute of Technology indicates that the foundry field is promoting research in various phases. One project being carried out at the institute is the application of shell molding to production of nodular iron castings. Another involves the use of other minerals and ores instead of sand as the molding medium. Other studies include ceramic coatings for water-cooled metal molds, effect of cereal binders in molding sands and cores, use of southern bentonite, hot tears in steel castings, flow of molten steel, and study of whirl gates.

* * *

CAREFUL scrutiny of all phases of operational procedure often is required before some problems can be solved, and in the investigation the aid of an outsider's viewpoint may be of material assistance. For example, a steel foundry for several months obtained in its carbon analyses results that were consistently higher than those determined in its customer's laboratory. The discrepancies often were large enough that the foundry no longer could be certain that the castings were meeting customer specifications. With the help of a chemical consultant from Sam Tour & Co., New York, it was found that while chemical procedures were accurate, the trouble was in the method of obtaining the samples. Test coupons were drilled without cleaning, and under constant pressure. Drillings then were screened and only the 8 to 20 mesh were used for analyses. Recommended procedure was to remove adhering sand and oxide from the coupons by grinding, and then drill with intermittent pressure to prevent "burning." Oversize chips are broken in a mortar, and all chips then are used for the analytical sample. New and time saving methods for routine analyses also were suggested by the consultant, resulting in improvement of analytical efficiency.

* * *

NEW silicone resin base finish having the surface hardness and durable qualities of porcelain, but without its brittleness, recently has been developed by Glidden Co., Cleveland. Coating requires curing at 425°F. and is available in several shades of whites, grays and yellows as well as blue, tan, green and red.

* * *

SILICONE "bouncing putty", an intriguing chemical curiosity which can be pulled like taffy, broken with a quick snap, or bounced like a ball, now is working for industry, according to General Electric Co. Thinned to a fluid paste and painted on joints before welding, the product is said to promote uniform weld penetration and to eliminate harmful effects of air on the underside of welds. It is suggested for all arc welding processes except inert-arc welding. Easily applied to complex parts the powder residue left after welding can be removed with a cloth. Compound promotes no pickup of carbon, gives off no noxious fumes, and is nonexplosive. One 16-ounce can of the silicone putty paste covers 1300 linear feet of joint when applied in a strip ½-in. wide.

Pouring lines of Logan heavy duty rolls handle large molds through pouring and to shake-out. Rolls are equipped with shot shields to protect bearings from sand and spilled metal.

Man-Handling produces nothing

Don't move it by hand — when you can move it by conveyor. Through every stage of foundry operations Logan Conveyors are releasing workers from slow, costly man-handling . . . freeing them for productive tasks. Now is the time to conveyorize. There are Logan Conveyors for empty flasks, for massive molds, and everything in between. If you have a handling problem, let Logan engineers, with four decades of experience, contribute that "something extra" to your conveyor layout. Write for literature, or for engineer to call.

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SPEED *Prevents* WASTE

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Ajax-Northrup Induction Furnaces melt so fast there's no time for "burning-up" chromium, molybdenum, master alloys, and other easily oxidized materials.

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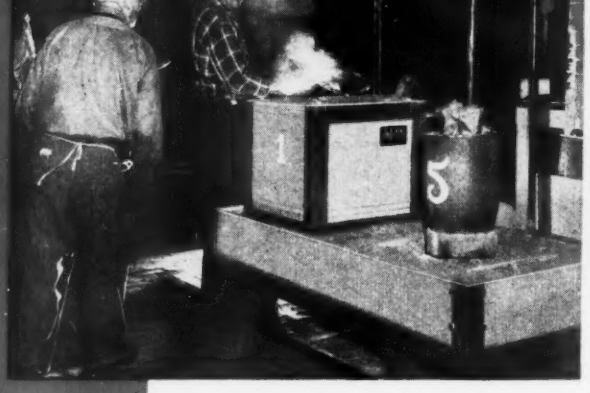
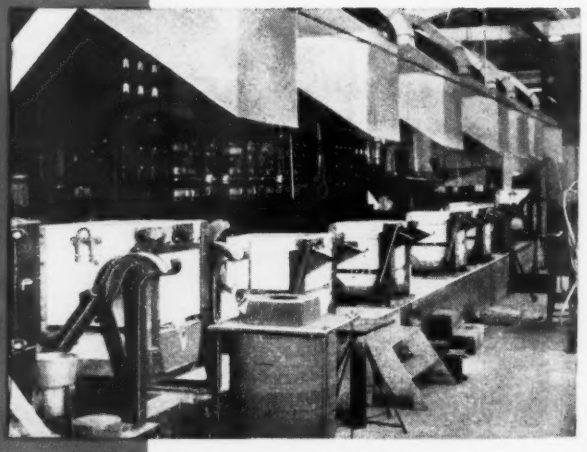


NON-FERROUS MELTING



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AJAX ENGINEERING CORPORATION

Typical Brinell Hardness Numbers

Typical Brinell Hardness Numbers of Some Nonferrous Alloys

Copper-base Alloys

Type Alloy	Condition	Cu	Sn	Zn	Pb	Al	Mn	Fe	Ni	Other	Brinell
Cu-deox.	Sand Cast	Rem								P 0.05	43
Cu-Al	Sand Cast	90.0				10.0					90–109
Cu-Al-Fe	Sand Cast	Rem				8.6		2.9			109–124
Cu-Al-Fe	Cent. Cast	Rem				8.6		2.9			116–131
Cu-Al-Fe	Sand Cast	Rem				9.0		3.0			100
Cu-Al-Fe	Sand Cast	Rem				9.5		1.0			115–126
Cu-Al-Fe	Cent. Cast	Rem				9.5		1.0			121–134
Cu-Al-Fe	Sand Cast	Rem				11.0		3.7			159–183
Cu-Al-Fe	Cent. Cast	Rem				11.0		3.7			166–187
Cu-Al-Fe	Sand Cast	Rem				14.1		4.5			321–352
Cu-Al-Fe	Sand Cast	89.0				10.0		1.0			92–96
Cu-Al-Fe-Mn	Sand Cast	Rem				7.18	0.58	0.62			69
Cu-Al-Fe-Mn	Chill Cast	Rem				10.0	3.0	3.0			159
Cu-Al-Fe-Ni	Sand Cast	Rem				10.0		5.0	5.0		170
Cu-Al-Mn-Fe-Ni	Sand Cast	Rem				13.5	0.5	4.0	1.0		300
Cu-Al-Ni	Chill Cast	Rem				10.0			5.0		185
Cu-Be	Quenched	Rem								Be 1.0	65–70
Cu-Be	Q. & aged	Rem								Be 1.0	125–130
Cu-Be	Cast	Rem								Be 2.2	109
Cu-Be	Q. & aged	Rem								Be 2.2	400
Cu-Be	Quenched	Rem								Be 2.4	110–130
Cu-Be	Q. & aged	Rem								Be 2.4	340–370
Cu-Fe	Sand Cast	Rem						50.0			130
Cu-Pb	Sand Cast	Rem	0.46		11.68	0.09				B 0.025	35
Cu-Pb	Chill Cast	Rem	0.16		12.66	0.09				P 0.027	38
Cu-Pb	Sand Cast	Rem	0.07		19.26	0.05					25
Cu-Pb	Chill Cast	Rem	0.07	0.15	20.94	0.13					26
Cu-Pb	Chill Cast	Rem	0.12		24.40	0.11				P 0.078	27
Cu-Pb	Sand Cast	Rem	0.24		26.33	0.10				P 0.064	23
Cu-Pb-Sn	Sand Cast	Rem	5.36	0.82	8.61			0.04	0.14	Sb 0.34 P 0.04	52
Cu-Pb-Sn	Sand Cast	Rem	9.91	0.29	9.81			0.05	0.18	Sb 0.28 P 0.04	64
Cu-Pb-Sn	Sand Cast	Rem	10.0		10.0					P 0.05	50–70
Cu-Pb-Sn	Sand Cast	Rem	8.0	1.5	15.0						45–65
Cu-Pb-Sn	Chill Cast	Rem	3.65	3.19	17.08						44
Cu-Pb-Sn	Sand Cast	Rem	3.52	3.43	17.50						52
Cu-Pb-Sn	Sand Cast	Rem	6.0	1.0	20.0						40–55
Cu-Pb-Sn	Sand Cast	Rem	9.76		20.10				0.62	Sb 0.14 P 0.03	60
Cu-Pb-Sn	Sand Cast	Rem	4.78		24.37					Sb 0.07	42
Cu-Pb-Sn	Sand Cast	Rem	2.0		35.0						28
Cu-Pb-Sn	Sand Cast	73.0	7.00		20.00			0.25			45
Cu-Pb-Sn	Sand Cast	78.0	7.00		15.00						48
Cu-Pb-Sn	Sand Cast	70.0	5.00		25.00			0.25			40
Cu-Pb-Sn	Sand Cast	81.0	7.00	3.00	9.00						50–55
Cu-Pb-Zn-Sn	Sand Cast	83.0	2.00	5.00	10.00						34
Cu-Ni	Sand Cast	54-56							44–46		75–85
Cu-Ni-Si	Sand Cast H.T. 840° F	Rem									
Cu-Ni-Sn	Sand Cast	Rem	5.0						2.5	Si 0.6	200
Cu-Ni-Sn	Sand Cast w.q. aged 500°	Rem	5.0						5.0		75
Cu-Ni-Sn	Sand Cast w.q. aged 600° F	Rem	5.0						5.0		136
Cu-Ni-Sn	Sand Cast w.q. aged 500°	Rem	5.5						5.0		171
Cu-Ni-Sn	Sand Cast w.q. aged 650° F	Rem	5.5						7.5		165
Cu-Ni-Sn	Sand Cast w.q. aged 600° F	Rem	7.0						7.5		213
									20.0		207

(*Continued on page* 204)

(*Continued from page* 203)

Type Alloy	Condition	Cu	Sn	Zn	Pb	Al	Mn	Fe	Ni	Other	Brinnell
Cu-Ni-Zn	Cast	Rem		6.0	5.0				20.0		64
Cu-Ni-Zn	Cast	Rem	4.0	6.0	5.0				20.0	..	114
Cu-Ni-Zn	Cast	Rem	4.0	6.0					20.0	..	114
Cu-Ni-Zn	Sand Cast	Rem	4.0	10.0	5.0				20.0		120
Cu-Ni-Zn	Cast	Rem		18.44			0.16		21.28		57
Cu-Si	Sand Cast	Rem								Si 5.0	77
Cu-Si-Mn	Sand Cast	Rem				1.0				Si 4.0	80
Cu-Sn	Cast	Rem	1.0							P 0.03	40
Cu-Sn	Cast	89.65	9.75	Rem	0.15					Sb 0.10	62
Cu-Sn	Sand Cast	Rem	10.0								74
Cu-Sn	Chill Cast	Rem	11.2							P 0.23	108
Cu-Sn	Cast	Rem	6.94	2.73	7.14				0.24	P 0.04 Sb 0.30	53
Cu-Sn	Cast	Rem	7.0	3.0	3.0						50
Cu-Sn	Cast	Rem	10.0	1.50	5.0						60
Cu-Sn	Cast	Rem	14.0	0.25	1.0						85
Cu-Sn	Sand Cast	80	20							P-trace	130
Cu-Sn	Sand Cast	89	11								80
Cu-Sn	Sand Cast	89	10.5							P-0.50	72–77
Cu-Sn	Sand Cast	90	10								65–70
Cu-Sn-Pb	Sand Cast	79.50	12.00		7.50					P 1.0	74–80
Cu-Sn-Pb	Sand Cast	84.25	10.00		5.00					P 0.75	60
Cu-Sn-Pb	Sand Cast	88.00	10.00		2.00						65–70
Cu-Sn-Pb	Sand Cast	79.75	10.00		10.00					P 0.25	65–70
Cu-Sn-Pb	Sand Cast	80	10.00		10.00						55–60
Cu-Sn-Pb	Sand Cast	84.0	9.50		6.30					P 0.20	59–61
Cu-Sn-Ni	Sand Cast	Rem	8.0						7.5		105
Cu-Sn-Ni	Sand Cast w.q aged 500° F	Rem	8.0						7.5		179
Cu-Sn-Zn	Cast	Rem	9.89	2.09							55
Cu-Sn-Zn	Cast	Rem	10.0	2.0							60–80
Cu-Sn-Zn	Cast	Rem	10.16	1.88	0.28			0.03		As 0.41 Sb 0.013 P 0.007	61
Cu-Sn-Zn	Cast	88.00	10.00	2.00							70–75
Cu-Sn-Zn-Pb	Sand Cast	85.5-86.5	10.5-12.00	1.5-3.5	1.0		0.15	0.25			90–120
Cu-Sn-Zn-Pb	Sand Cast	88.00	8.00	2.00	2.00						57–59
Cu-Sn-Zn-Pb	Sand Cast	87.8-89.8	7.0-7.8	0.4-3.4	1.5-2.3						50–70
Cu-Sn-Zn-Pb	Sand Cast	90	6.50	2.0	1.50						50–60
Cu-Sn-Zn-Pb	Sand Cast	85	5	5	5						50–60
Cu-Sn-Zn-Pb	Sand Cast	89	5	3	3						40–45
Cu-Sn-Zn-Pb	Sand Cast	85.7-89.3	9-11	1.5-2.5	0.3-0.8						80–100
Cu-Ti	Cast H.T. 840° F	Rem								Si 0.3 Ti 0.8	78
Cu-Zn	Cast	Rem		30.2							55
Cu-Zn	Cast & Annealed	Rem		30.2							57
Cu-Zn	Cast	Rem		41.04							90
Cu-Zn	Sand Cast	55.0		45.0							80–98
Cu-Zn-Al	Cast	63.35		Rem	0.25	4.12	2.74	1.73	0.20		179
Cu-Zn-Al	Cast	Rem		31.45		4.10		1.45	3.00		159
Cu-Zn-Al	Cast	Rem		33.57		3.95			3.13		185
Cu-Zn-Al	Cast	Rem	0.75	34.68		3.28		0.15	2.83		154
Cu-Zn-As	Cast	Rem		29.41				0.07		As 0.49	58
Cu-Zn-As	Cast	Rem		40.54				1.50		As 0.48	80
Cu-Zn-Fe	Cast	56.85	0.32	Rem		0.23	0.20				93
Cu-Zn-Fe	Cast	57.75-58.25	0.2-0.5	38.5-39.5	0.20	0.50	Trace-0.25	1.05-1.35			100–140
Cu-Zn-Fe	Cast	56.0	0.75	41.5		0.50	0.25	1.0			109–119
Cu-Zn-Fe	Cast	56.0	1.0	41.0		0.50	0.50	1.0			104–119

(*To be continued*)

Cupola **SMOKE SUPPRESSION**	*Automatic* **SAND PREPARATION UNITS**	*Wet-Type* **DUST COLLECTORS**

WE SUGGEST - - - *if you are considering the need for, or are not completely satisfied with your present SAND MULLING EQUIPMENT, CUPOLA SPARK and SMOKE CONTROL, WET-TYPE DUST COLLECTING - - - may we tell you about our special, new design?*

CONTINUOUS MOLDING SAND PREPARATION UNIT

Embracing well known mechanical means to promote and prolong intensified mixing, mulling, cooling, aerating molding sand. A wide departure from existing types in general use. Completely automatic—completely independent of the human element and error.

EFFICIENT LOW COST CUPOLA SPARK ARRESTOR AND SMOKE SUPPRESSOR.

Embodying a singularly new approach to the problem of separating and collecting carbonaceous matter from effluent gases. A completely new and truly effective means of combatting this great problem.

WET TYPE DUST COLLECTORS

Employing mechanical atomization of water, thereby producing a dense mist of minute globules flowing at high velocity, counter to the incoming dust laden air or high temperature effluent gases. New principle — no nozzles — no clogging.

WE INVITE YOUR INQUIRY.

Seasoned by 25 Years of Uninterrupted Service to the Foundry Industry

A. A. WICKLAND & CO.

Foundry Consultants

ENGINEERING BUILDING — Established 1919 — CHICAGO 6, ILLINOIS

Around the Country

NEWS REPORTS FROM

Indianapolis
Chicago
Washington
Philadelphia
New York
Detroit

Indianapolis

GENERAL feeling among both ferrous and nonferrous foundrymen is that there has been a steady, gradual increase in activity since December. Pickup in automotive business has been felt in recent weeks by gray iron and malleable shops, with some additional bolstering presumably being offered by orders for agricultural implement parts.

While no foundrymen will say that their shops are booming along at capacity rate, they do feel that operations are near normal. They are operating full work weeks, and incoming orders create an optimistic atmosphere that did not prevail a few months ago. The new orders represent predominantly civilian goods parts except in the case of steel castings, of which a greater percentage than in the case of other metals is going to fill defense needs.

Chicago

VISITORS to Chicago for the AFS convention, May 4-8, are going to be jolted when they find a three-block section of normally attractive Michigan Avenue looking like an open pit ore mine. Major construction activities are under way in the area embracing Michigan avenue and Grant Park between Randolph and Monroe streets. Explanation is that the city is building a two-level underground garage capable of accommodating 2359 autos.

It is hoped that traffic can be restored to Michigan avenue about Christmas, although the garage won't be completed until 1954. Grant Park will be restored to earth and sod and the trees returned and replanted.

Just across Randolph street at the north end of Grant Park the visitor can observe some additional unusual construction. Here Chicago is getting its first new major office building in many years—a 41-story structure.

Ground for this building, which will rise over the suburban station of the Illinois Central and overlook Grant Park, was broken last August. Work has been going forward since on the caissons and foundation and another four months will be required for their completion. Erection of the frame, involving 31,000 tons of structural steel, probably will begin the latter part of the year. Occupancy is scheduled for 1955.

Sinking of the caissons and installation of the foundation for the 600-foot-tall Prudential building is much more intricate and difficult than for the ordinary office building on an open site. This building will straddle 22 tracks of the Illinois Central and work has been handicapped considerably by train movements.

About 1 million square feet of rentable floor space will be available, of which the insurance company will use 30 per cent. Among features of the new structure will be an escalator system from train level through the 7th floor. A conveyor system of mail distribution for the company also will be installed.

Big projects like the underground garage and new skyscraper will use a lot of castings of one kind and another. So, maybe visiting foundrymen will want to take a good look.

Washington

MAGNESIUM, rapidly coming of age as an industry, displayed many of its wares at the first International Magnesium Exposition here early last month. Approximately 30 companies that are engaged in the casting and fabrication of magnesium or are supplying materials and equipment for the production of magnesium parts exhibited a wide variety of products to 25,000 visitors.

The exposition, sponsored by the Magnesium Association, was also participated in by four foreign companies, while the Armed Forces, U. S. Bureau of Mines and National Advisory Committee for Aeronautics likewise conducted extensive displays at National Guard Armory, the show site.

Magnesium casting producers represented at the exposition included: Acme Aluminum Foundry Co., Chicago; Aluminum Co. of America, Pittsburgh; American Radiator & Standard Sanitary Corp., Pittsburgh; Bendix Aviation Corp., Teterboro, N. J.; Doehler-Jarvis Corp., Toledo, O.; General Magnesium Foundries Inc., Belleville, Ill.; Howard Foundry Co., Chicago; Magline Inc., Pinconning, Mich.; Osbrink Mfg. Co., Los Angeles; Rolle Mfg. Co., Lansdale, Pa.; Superior Bearing Bronze Co., Brooklyn, N. Y.; Utica Radiator Corp., Utica, N. Y.; and Wellman Bronze & Aluminum Co., Cleveland.

Philadelphia

GRAY IRON foundry operations show modest improvement. They are now at around 80 per cent of normal, compared with 70 per cent a month ago, and backlogs are somewhat better at around three to four weeks.

Improvement is greatest among shops producing smaller castings. Lag is in the larger work, involving castings from 1000 to 10,000 pounds. This reflects in part the situation in machine tools. Machine tool business has been improving of late but not to the point where it has resulted in more work for the nonintegrated casting shops.

Backlogs of steel foundries continue to ease, now averaging around 12 weeks or slightly more. However, steel casting makers anticipate active operations the greater part of the year. Government work is still strong, with no early cutbacks anticipated.

In company with the gray iron shops, malleable foundries are somewhat more active, operating about 80 per cent of normal, which means 5-day operations in most cases although not necessarily with a full working crew. Improvement reflects

(*Continued on page* 208)

This 105-Ft. Conveyor Does Tremendous Job on One Horsepower!

This rugged, 105-Ft. Carrier Compact Conveyor handles an abrasive bulk chemical — conveys it quickly and efficiently, on 1 H.P. The unit's integral, self-cleaning pan is only 8" wide and 3" deep — its over-all height is less than 13"!

Carrier Compact Conveyors can be equipped with dust covers, dividers, intermediate discharge sections, screen decks, etc., to meet your processing requirements. They are now successfully handling a variety of bulk chemicals and foods . . . metal chips and castings . . . small turnings . . . and other hot, wet, abrasive, sticky or hard-to-handle products.

STANDARD POPULAR SIZES AVAILABLE FROM STOCK!

Carrier Compact Conveyors are the smallest units in the *complete* Carrier line of Natural-Frequency Conveyors (the largest of which have capacities up to 200 tons per hour). These spectacular conveyors work on a unique vibrating principle which substitutes the natural resonant action of springs, for brute force. Though up to 90% of the power output of a "brute-force" conveyor may be required to operate its moving parts — and only about 10% to convey its load — Carrier Natural-Frequency Conveyors require virtually no more power to operate, empty, than to run the motor alone! The result — *smaller motors, far less wear-and-tear, and an absolute minimum of maintenance and down-time!*

Get all the facts on Carrier Natural-Frequency Conveyors, including vibration-free units and vibrating spiral elevators. Mail the coupon, *today!*

"COMPACT" FEATURES

LESS POWER REQUIRED
(750-foot-tons per hour per H.P.)

LESS MAINTENANCE AND DOWN-TIME
(Less power + good design = good service)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

MINIMUM SPACE REQUIREMENTS
(Over-all height of less than 13")

SCREENS, DEWATERS, SEPARATES, BLENDS, DRIES, COOLS
(Combines processing with conveying)

PROCESSING FEATURES AVAILABLE
(Dust covers, dividers, intermediate discharge sections, screen decks, etc.)

SELF-CLEANING
(Continuous smooth trough — no pockets)

WIDTHS FROM 6" TO 24"—LENGTHS FROM 5' TO 200'
(With integral pans of steel or other alloy metals, 12 gauge to ¼" plate, open or enclosed)

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Gentlemen:

Without obligation, please send me complete information on Carrier Natural-Frequency Conveyors.

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Att. Mr._____ Dept._____

Fig. 1 (below) — This record-breaking aluminum-bronze casting is destined to be a 6-ton turbine runner for a hydroelectric plant when it is completed

Fig. 2 (above)—Pouring of the giant casting required 20 minutes. Workers who handled the job resembled ghosts in the asbestos clothes they wore

Huge Aluminum-Bronze Casting

Requires 25,000 Pounds of Metal

PERHAPS the largest aluminum-bronze casting ever made in the United States was produced recently in Milwaukee by Ampco Metal Inc. The company poured 25,000 lb of metal during the casting, for the Pelton Water Wheel Co., San Francisco, of a Francis type turbine runner for installation in the turbine of a hydroelectric plant in the Sierra Nevada mountains. The alloy used was specified because of its resistance to corrosion, abrasion and cavitation erosion.

Production of the mold and the cores for the casting required a week. When closed, the mold measured 12 x 14 ft and stood 10 ft high. The pouring operation required 20 minutes and was supervised by five men whose total service with the company represented 80 years of work. Fig. 2 shows the pouring operation and the ghostly appearance of workmen, in asbestos clothing.

Upon its completion, the casting will be over 4 ft high and 8 ft in diameter. It will weigh 6 tons. Fig. 1 shows the rough casting.

This application is the first use of the alloy in hydroelectric service for Ampco, and it comes as a result of extensive tests in the field and of co-operative work with others who have used the metal. The production of bronze castings for hydroelectric service requires a foundry with large melting capacity, such as possessed by Ampco. The company has had considerable experience in aluminum bronze production.

Ampco was organized in 1914 as the American Metal Products Co., to produce bushings, gears and noncorrosive acid-pickling equipment. It also made slippers and screwdown nuts for the steel mills, where the metal's working qualities proved to be an important factor. Today the company also operates a West Coast division in Burbank, Calif.

(*Continued from page* 206)

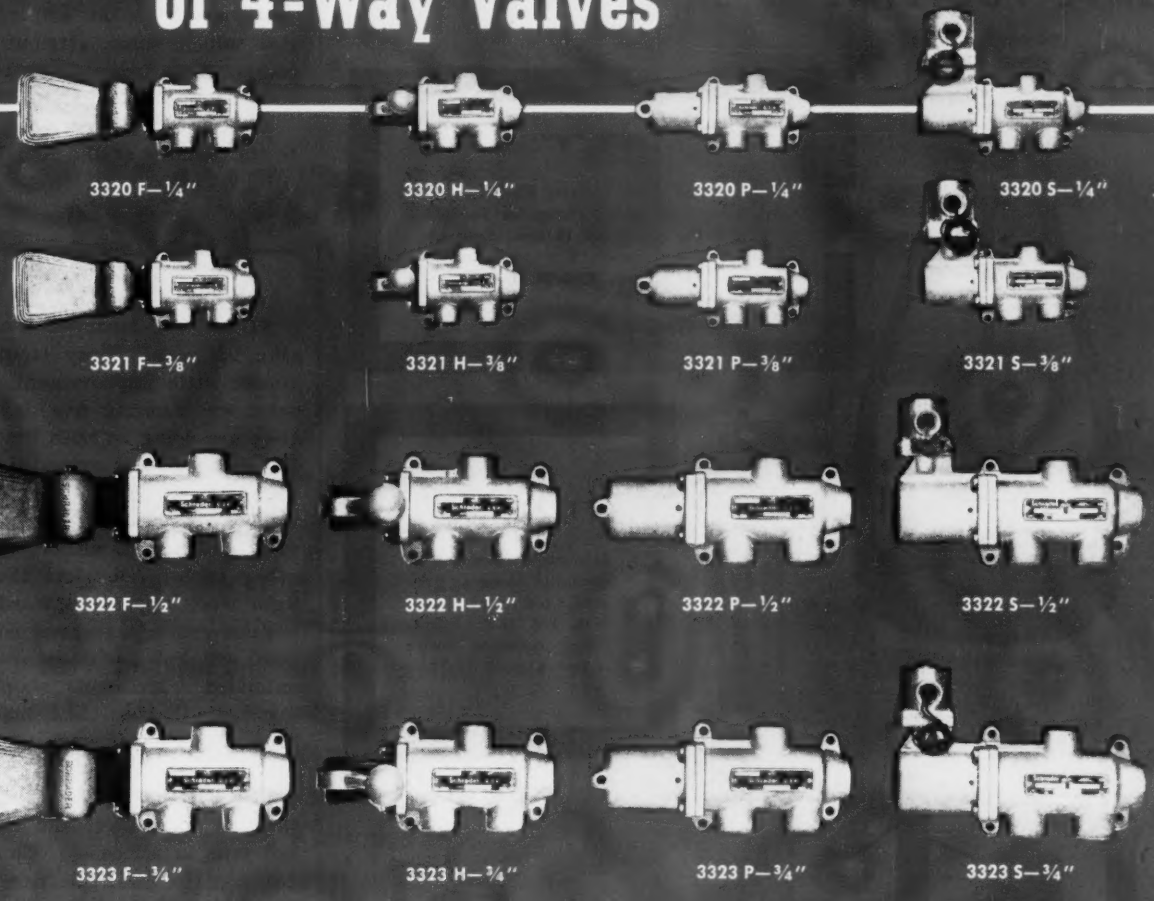
seasonal demand from agricultural equipment manufacturers and to a certain degree a fanning out of requirements for the automotive industry. Railroad equipment needs still lag, this being true with regard to steel castings as well as malleable castings. Backlogs at malleable shops now average four to five weeks.

Most brass and bronze shops are doing fairly well. They are not as active as the light metal foundries, which are confronted with heavy military demands particularly for the aircraft industry, but most are able to engage a full shift for at least five days a week.

Apart from copper, raw materials

(*Concluded on page* 210)

Schrader presents a complete NEW LINE of 4-Way Valves



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Feature light foot action—can be operated all day without fatigue.

HAND OPERATED
Feature light snap on and off action for fast, accurate control.

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Especially desirable for remote control applications.

SOLENOID OPERATED
Available for 110, 220 or 440 volt AC.

These new Schrader Valves are primarily designed for operation of Double-Acting Cylinders. Their simplified design and construction of long-lasting metals assure reliable, long service with minimum maintenance. Can be serviced without removal from airlines. Available in the popular sizes ¼, ⅜, ½ and ¾ N.P.T., they are produced for flow capacities from 160 to 425 cubic feet of free air per minute at 100 psi inlet pressure. They demonstrate again Schrader's leadership in compressed air equipment. For full details, write—or fill out and mail the coupon below.

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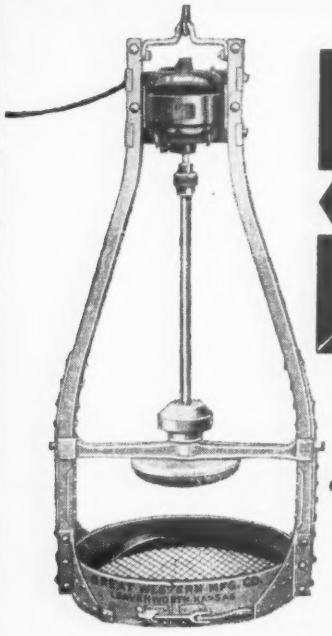
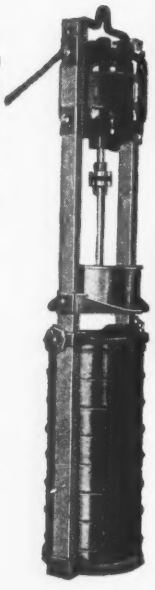


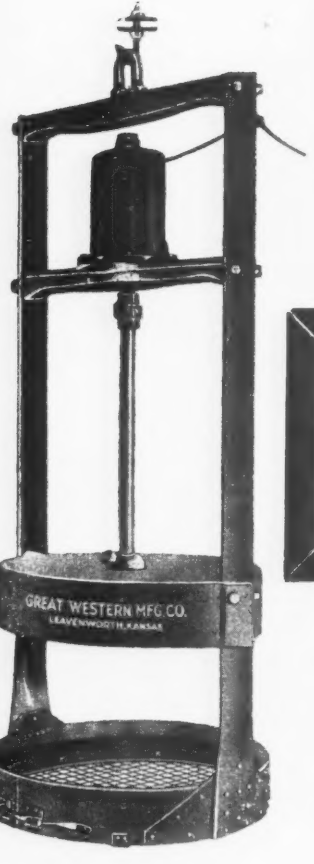
TYPE "V"

Screens sand Fine, Coarse, Medium. 20" dia. sieve with special clamp for 5-second changes. Does work of 10 men. Fully-enclosed 1/6 h.p. motor. 4' 6" high, weight 100 lbs. 20" Sieve: $250.00. Giant V-5, 36" Sieve: $450.00



TYPE "HL"

Laboratory model. . . specially designed for sand control. Fitted with 1/6 H.P. motor. Price, complete less sieves: $225.00



TYPE "CS"

24" square sieve. Continuous operation, no dumping. Refuse tails off to one side. Height 4' 10", weight 295 lbs. With 1/3 h.p. enclosed motor. Complete: $320.00

TYPE "CR"

24" dia. round sieve. Thoroughly *sifts, mixes, fluffs, aerates* the sand. 1/3 H.P. enclosed motor. Height 4' 6", weight 250 lbs.

Complete: $310.00

Prompt Delivery from Your Foundry Supply House

GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS

(*Concluded from page 208*)

are in ample supply. This is particularly true of such tonnage items as pig iron and ferrous scrap.

District pipe shops have not responded to seasonal influences as rapidly as expected. There is still a pronounced lag at soil pipe foundries which some attribute to keen competition from southern producers.

Budd Co. is adding a machine shop to its foundry at the Red Lion plant.

FOUNDRY business is still on the sluggish side. Gray iron operators report little improvement, and while most are running five days a week, they are doing so with limited crews. Backlogs are not extended more than two or three weeks. Dullness is particularly prevalent among the light gray iron shops, although in certain other eastern districts the trend in light work appears upward.

Steel castings demand continues to level off, but backlogs are still well extended. Malleable shops are doing little better than holding their own. Brass and bronze job shops find business spotty. Only among the captive foundries do operations appear at high level and even this is not true in all cases. Captive shops catering to maritime needs find demand definitely slower.

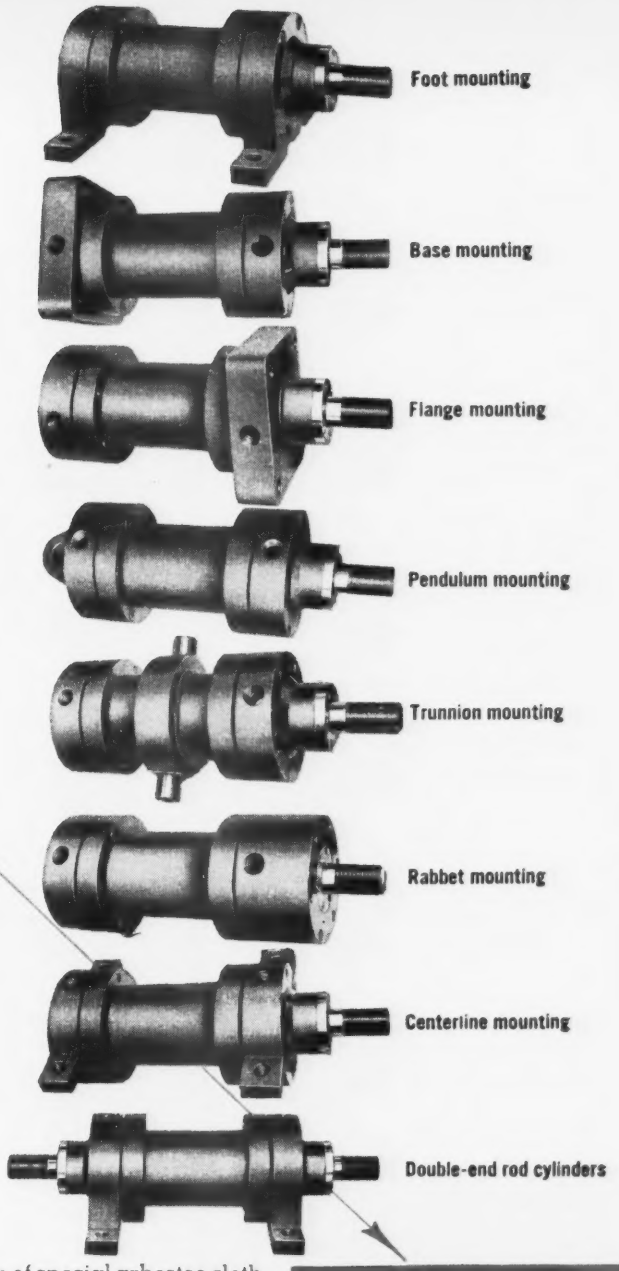
SUSTAINED high auto production is fostering active foundry operations here. Particularly busy are gray iron foundries producing die blanks; some are reported working ten hours daily and Saturdays to meet demand. Malleable foundries are also pressed for production and are working a full or slightly extended work week. Nonferrous foundries are reported active but no extension of the work week to meet demand is known.

Threatening to crimp foundry output is the tight Detroit labor market. While no unusual shift to automotive jobs is reported, the bulk of labor flowing into Detroit is going to the auto plants. Foundrymen are hard put to find extra help needed to meet rising backlogs, and orders threatened with delay are reported fanning out from the motor city to less active areas. But all in all, foundrymen here ride the automotive booms and busts; right now the boom is on.

LINDBERG HYDRAULIC CYLINDERS

... now available for pressures to 3000 PSI

For extra power applications, it'll pay you to investigate the new Lindberg line of hydraulic cylinders for operation up to 3000 PSI ... ruggedly and heavily designed for extra performance. Added to the 1500 PSI hydraulic cylinders, this line gives you a selection from 0 to 3000 PSI ... and supplements the Lindberg line of air cylinders.



Check these Lindberg features for dependable, low cost power for lifting, forcing, pulling, pressing, pushing and clamping:

ROTATING CAPS ... Caps can be easily rotated in order to position ports for piping. Just remove cap screws, and revolve head cap ... it isn't necessary to disassemble cylinder. This feature permits simplified piping, and frequently eliminates need for T-fittings or elbows.

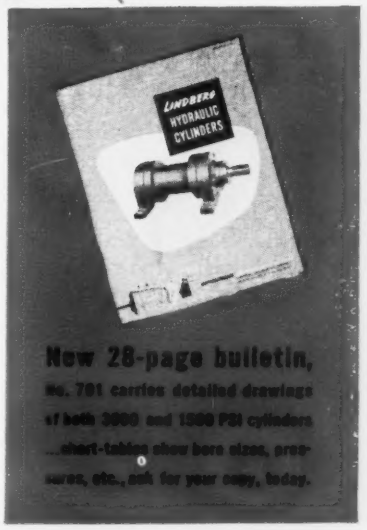
NO TIE-RODS ... Welded flange construction eliminates need for tie-rods ... insures proper alignment.

PACKING RESISTS OIL AND TEMPERATURE ... Chevron type piston rod packing is made of special asbestos cloth and rubber compound ... resists high temperature ... is not affected by oil.

NEOPRENE O-RINGS ... Conventional gaskets are replaced by Neoprene O-rings. Sealing action is automatic ... the higher the pressure, the tighter the seal.

SOCKET-HEAD CAP SCREWS ... All screw heads are in the open and easily accessible from outside the cylinder. It is not necessary to partially disassemble cylinder to tighten screws.

Lindberg 3000 PSI Hydraulic Cylinders come in 8 mounting types and 10 bore sizes from 2" to 8".



New 28-page bulletin, no. 701 carries detailed drawings of both 3000 and 1500 PSI cylinders ... short-tables show bore sizes, pressures, etc., ask for your copy, today.

LINDBERG AIR & HYDRAULIC DIVISION

Lindberg Engineering Company · 2453 West Hubbard Street · Chicago 12, Illinois

Photo courtesy *Indianapolis News*

The Circle, historical hub of activity in the center of Indianapolis

INDIANAPOLIS Clears the Air

By ROBERT H. HERRMANN
Associate Editor

OUTSTANDING example of co-operation between foundries and air pollution control bureaus is the City of Indianapolis where, for nearly four years, J. G. Mingle as superintendent, Bureau of Air Pollution Control, has been befriending industry and cleaning up the air enveloping the city.

A former industry man, Mr. Mingle feels that the problem of air contamination should be approached from the engineering standpoint in talking with foundry management rather than as a law violation requiring arbitrary policing.

The present air pollution control ordinance has been in effect since May, 1949, shortly before Mr. Mingle was appointed superintendent. It provides that no combustion device may emit from its stack fly ash exceeding 0.75 grains per cubic foot of flue gas at a temperature of 500°F, applying to stack temperature of 850°F or less; of that amount, not to exceed 0.2 of a grain per cubic foot shall be of such size as to be retained on a 325 mesh sieve. Conformance to these restrictions is mandatory when the percentage of excess air in the stack does not exceed 50 per cent at full load.

Enforcement of the ordinance is in charge of the superintendent of air pollution control who is appointed by the mayor and is responsible to the Department of Public Safety, a three-man bureau also appointed by the mayor. Operated under this department are all activities having to do with public safety, including the police and fire departments.

Most of the field work of the Bureau of Air Pollution Control, which this year is operating on a budget of $34,000, is done by five inspectors who, according to Mr. Mingle, devote almost 75 per cent of their time to educating personnel in individual companies on proper firing methods and offer other suggestions for reducing smoke and other air contaminants. Law enforcement work, of course, is one of the bureau's jobs. In this phase of the work Mr. Mingle follows a procedure which he feels gets results; experience has proved him correct. And that is, patience and tenacity.

He doesn't become insistent or impatient with a plant that he realizes is working on eliminating a pollution problem. On the other hand, he never gives up on a repeated violator until results are obtained.

The control bureau has had excellent co-operation from Indianapolis newspapers in publicizing its activities in abating the emission of contaminants into the air. Emphasis has been on what various plants have done to reduce or eliminate the discharge from their stacks and not upon what the bureau has done to enforce the law. Mr. Mingle sees no reason why the bureau should brag about its activities when, for the most part, it courteously reminds industry to comply with the law and offers suggestions as to how it can be done.

In addition to complying with the law, foundries are finding that installation of emission control equipment, while costly in most cases, is effecting unthought of savings which help amortize the original cost.

Maintenance problems are reduced in every case. Roofs, gutters, yards, windows, exterior walls require less work in cleaning and less frequent cleaning. Air around the buildings is cleaner and therefore when drawn into the buildings, either through open windows or ducts in ventilating systems, it carries less dirt to settle somewhere in the shop and offices, where someone will have to clean it up. Working conditions are improved and worker morale is boosted. Then, too, improved public relations and acquisition of a reputation for good neighborliness have incalculable benefits.

Three Indianapolis foundries in recent months have installed equipment to control emission of contaminants from their cupola stacks. National Malleable & Steel Castings Co. has installed a system in which the cupola stack is tightly capped. The installation also includes an efficient heat exchange which makes use of exhaust gases to heat blast air. Grindle Corp., Markham, Ill., built the unit. Smoke and dust from the stack have been reduced at least 85 per cent, melting rate has been increased 20 per cent and coke savings alone, it is estimated, will pay for the equipment in ten years.

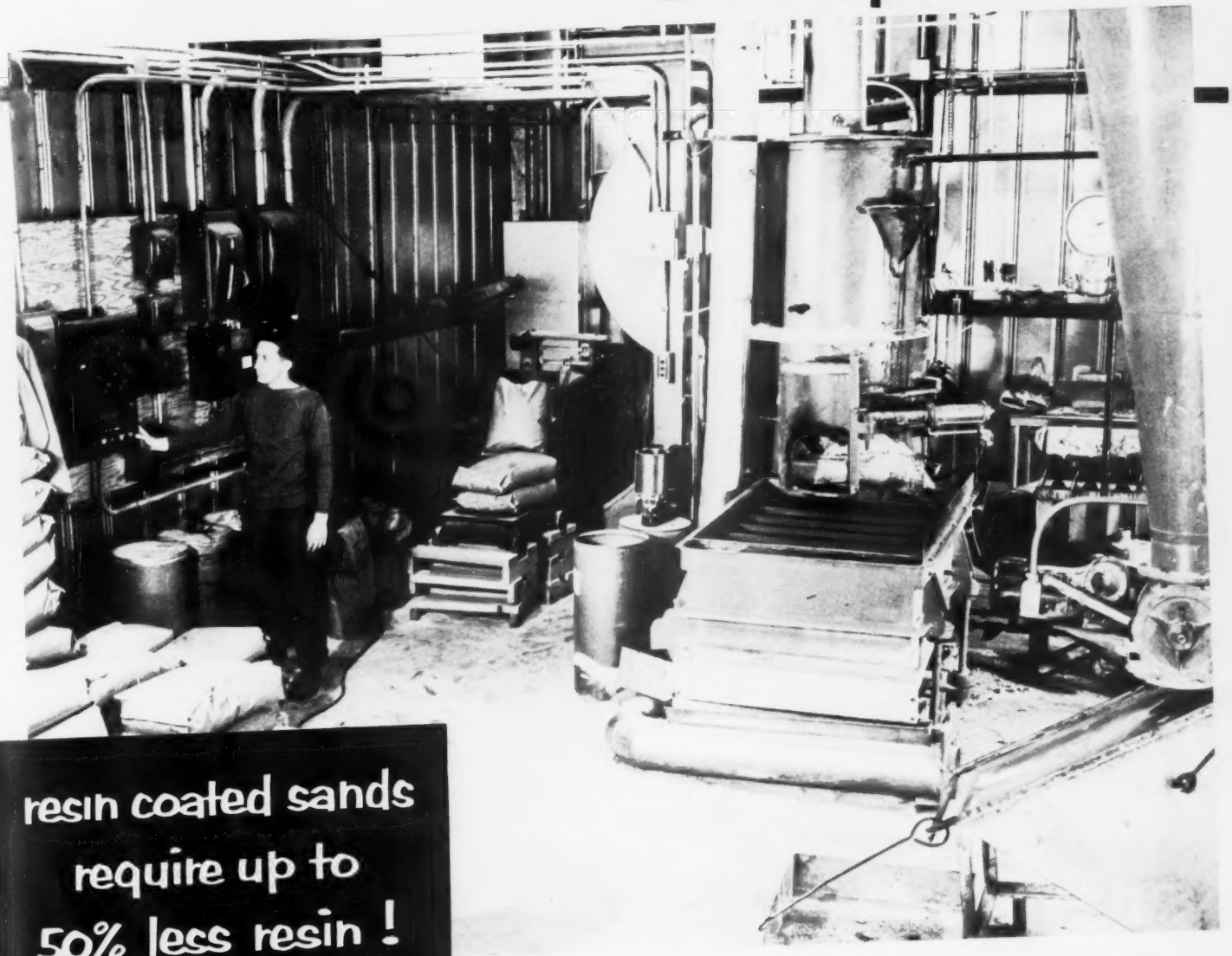
International Harvester Co. installed a unit of its own design which has reduced cupola stack emissivity by 50 to 75 per cent. The unit makes use of gas burners mounted into the cupola wall just below the charging door. Combustible materials in the stack are almost completely consumed.

At American Foundry Co., 6 South Tibbs Ave., a wet-type collector is taking 6 tons of material from cupola exhaust gases every eight hours. Previous to the installation about nine months ago, two men had been engaged full time in cleaning

(*Concluded on page* 215)

SHELL MOLDING SAND

Actually coated with resin by new process!



resin coated sands require up to 50% less resin !

Using a newly developed liquid resin instead of powdered resins, Beardsley & Piper engineers have perfected *the Special Speedmullor for the process of actually coating the sand grains with resin during mulling.* Because the resin is perfectly distributed through the sand in a uniform coating around the sand grains, up to 50% less resin is required for equal tensile strengths. Strength, permeability, and melting point are precisely controlled.

Resin coated sands are not dusty and, therefore, a health and safety hazard is eliminated. Coated sands may be handled with ease, with no danger of partial polymerization during storage. Since the resin actually coats the sand, there can be no resin segregation during storage or usage.

This new process is made possible by the design features of the Special Speedmullor. If you are interested in shell molding, you'll want information on the Special Speedmullor, resin coated sand process. Sand samples are available.

FOR FULL INFORMATION,
write to: Beardsley & Piper,
Division Pettibone Mulliken Corp.,
2424 N. Cicero Ave., Chicago 39, Illinois.

LOOK TO
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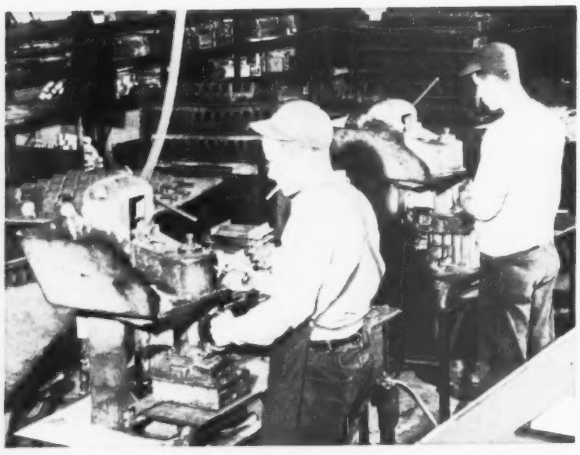
B P

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Champion Core Blowers Set Production Pace In Jobbing Foundry



Close-up of CB-5 Core Blowers shows blowing of two-pound block core for an automotive water pump body.

MIDWEST FOUNDRY COMPANY, COLDWATER, MICHIGAN, a jobbing foundry making high grade automotive castings, has greatly increased efficiency of its core room operations with the installation of eight B & P Champion Core Blowers.

The Core Blowers (five are CB-10s and three are CB-5s) are placed on either side of a single conveyor belt carrying cores to the loading station of a vertical, continuous core oven. Typical jobs for the CB-10 Core Blower include automotive clutch ring and power take-off cores.

Let us send you information on the complete line of Champion Core Blowers . . . there's a size to meet your exact needs! *Write to Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 N. Cicero Ave., Chicago 39, Illinois.*

LOOK TO
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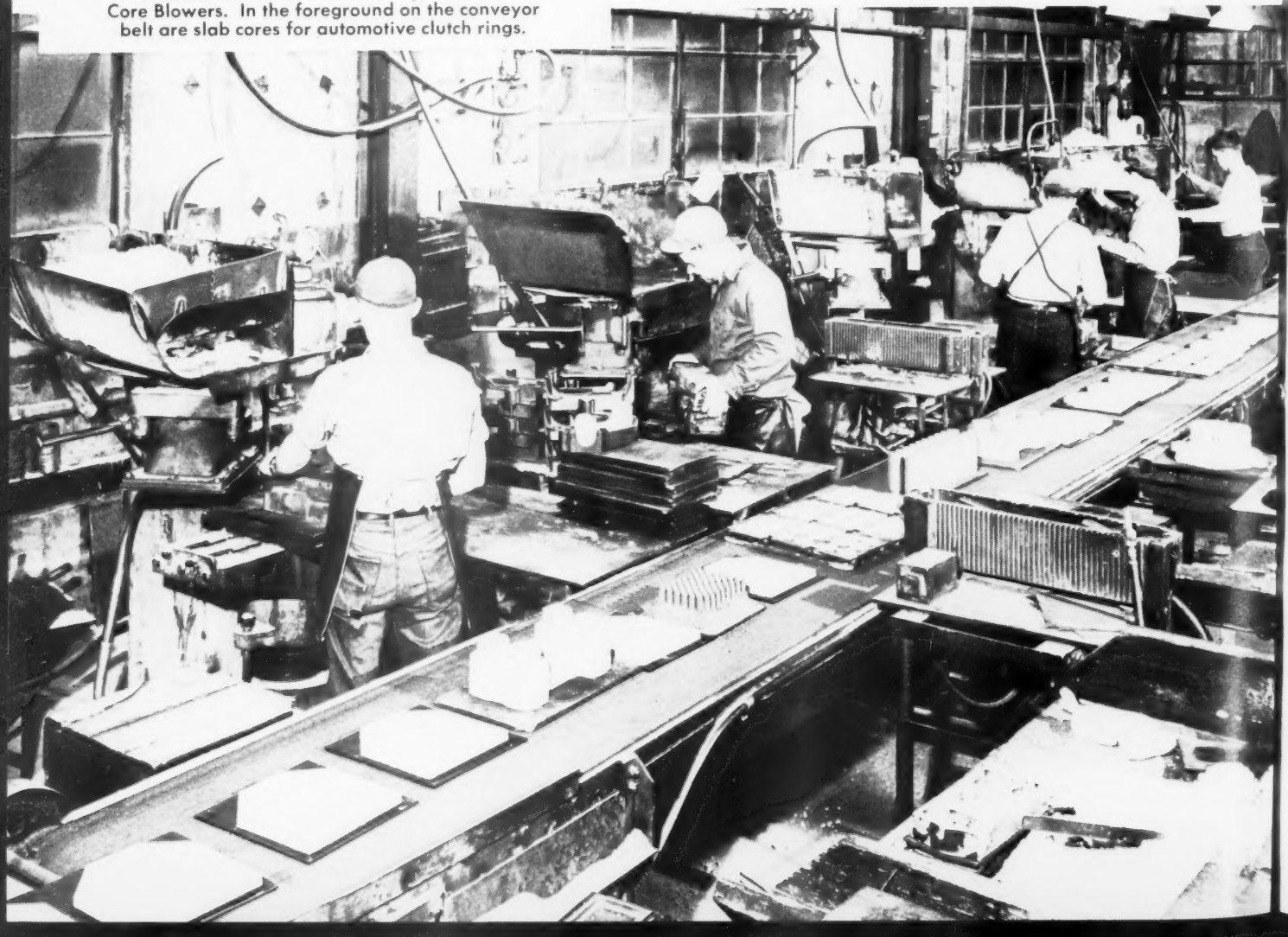
B P

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The major portion of Midwest Foundry's cores are blown on this line of five Champion CB-10 Core Blowers. In the foreground on the conveyor belt are slab cores for automotive clutch rings.



(*Concluded from page 212*)

deposited material off the foundry roof and out of the gutters. The roof has not required cleaning since installation of the collector.

Indianapolis industries seem to be grasping the idea that a cleaner city is not only a better place in which to live, but improved public relations bring about less strife and more pleasure in conducting a business. And the total, overall cost is not as great as it first appears to be. This attitude is attributed by foundrymen themselves in great part to the way in which the city's Bureau of Air Pollution Control goes about the task of helping industry conform to the law.

This article was prepared following a four-day visit to Indianapolis early in March, which included an interesting interview with the superintendent, Bureau of Air Pollution Control of that city. Just before this issue went to press, word was received of the unexpected death of Mr. Mingle on March 28. Plans for publication of the article were continued with the thought that it provides a tribute to the fine work of Mr. Mingle in bringing co-operation between government and industry in solving pressing problems.

The Editors

Air Pollution Group to Meet in Baltimore

The annual meeting of the Air Pollution Control Association will be held May 25-28 at the Lord Baltimore Hotel, Baltimore. Local arrangements for reception and entertainment of the guests are being made by a committee headed by Milton Reizenstein, Baltimore smoke abatement engineer, and by L. H. Denton, Baltimore Convention Bureau.

The meeting will begin with a luncheon followed by a boat trip along the Baltimore harbor front, where the guests can see the progress the city's industry has made in curbing smoke and other forms of air pollution. Technical papers will be presented on coal, oil, incineration, stack gas dispersion and stack design, bag filters for the control of cupola fumes and on other subjects.

The association banquet will be held the evening of May 27.

Offers Film on Casting

A folder that gives complete information on how to obtain a new 16-mm color-sound movie entitled "Microcast, a Story of Progress" is available from Microcast Divison, Austenal Laboratories Inc., 7001 South Chicago Ave., Chicago 37. The film explains the development and uses of the company's process of investment casting and can be borrowed without charge.

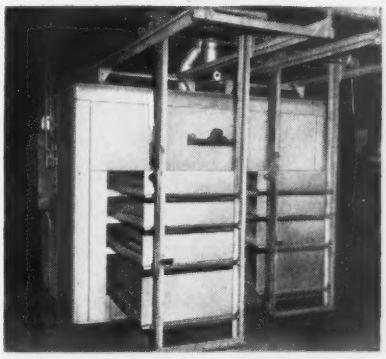
FOUNDRY OVENS

with MAXIMUM AIR RECIRCULATION

H-O-R-I-Z-O-N-T-A-L-L-Y

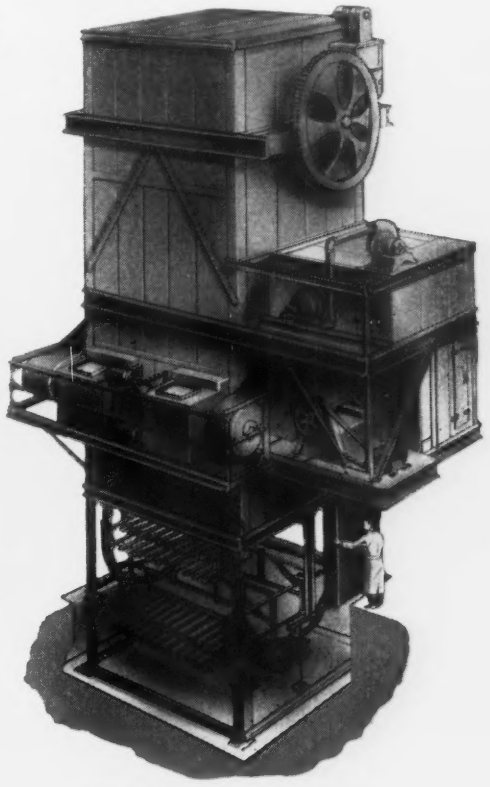
Another
ENGINEERING ACHIEVEMENT
By

MICHIGAN OVEN COMPANY MOCO DETROIT MICHIGAN



ROLLER DRAWER OVEN

CAR OR RACK OVEN



CONVEYOR CORE OVEN

WRITE FOR NEW FOLDER

it shows and describes MOCO's complete line of Foundry Ovens—and how they can *step-up efficiency* and *cut costs* for YOU.

Maximum volume of recirculated air provides a new high in *temperature uniformity*—*faster baking*—*elimination of hot spots*. Heaters and fans are self-contained within the oven structure — eliminating heat losses and field insulation—and saving floor space.

Capacity is more than ample for heat, recirculation, and exhaust. Accessory equipment is of highest quality.

MICHIGAN OVEN COMPANY

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This man is BUILDING

Famous CORNELL CUPOLA FLUX

EXCLUSIVE
SCORED BRICK FORM
(APPROX. 4 POUND BRICK)

GA WALL

against many casting rejects

TYPICAL SCENE IN GRAY IRON FOUNDRIES AND MALLEABLE FOUNDRIES WITH CUPOLAS

Where *Famous* CORNELL CUPOLA FLUX

is tossed into cupola with each charge of iron, only clean free-flowing iron reaches the molds, and casting rejects are reduced to the minimum.

Famous Cornell Cupola Flux is a "master craftsman" at eliminating foreign matter from molten iron. Furthermore, it makes iron hotter and more fluid, greatly reduces sulphur and keeps slag fluid.

Its SCORED BRICK FORM enables you to use it quickly, accurately and without waste. You simply toss this flux into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller or fractional charges, as per instructions.

Famous Cornell Cupola Flux keeps cupolas cleaner, too—reduces maintenance. There is less digging out because drops are cleaner and bridging over is practically eliminated. And a glazed or vitrified protective surface is formed on cupola lining, greatly reducing erosion of brick or stone—reducing patching.

WRITE FOR BULLETIN NO. 46-B

THE CUPOLA before using Famous Cornell Cupola Flux.

THE CUPOLA where Famous Cornell Cupola Flux is used.

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

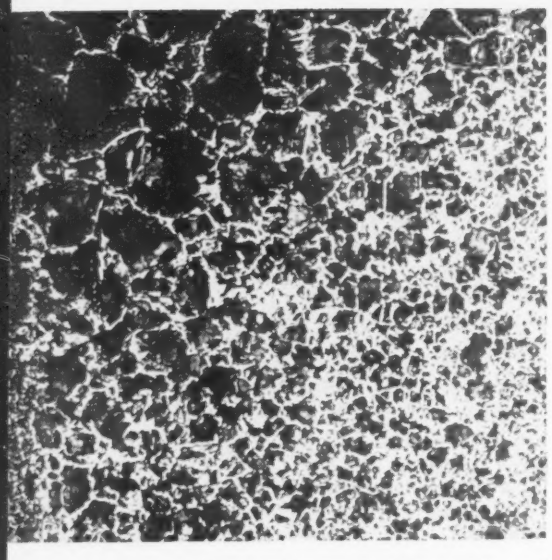


Fig. 21 — Weld and heat-affected zone, one pass weld metal, on left, nital etch X100, plain carbon steel

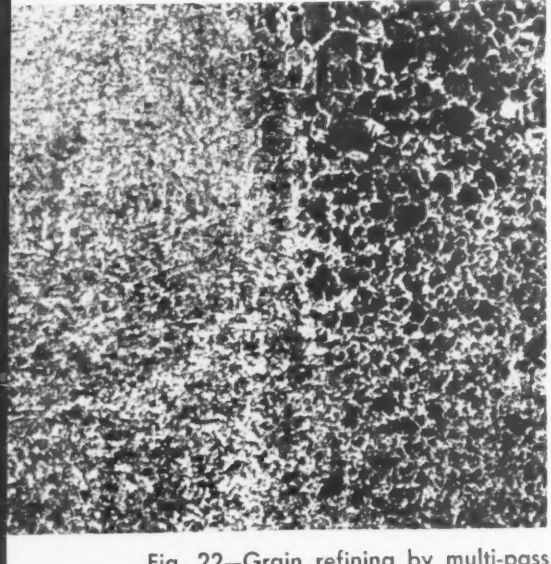


Fig. 22—Grain refining by multi-pass welding, weld metal left, nital etch

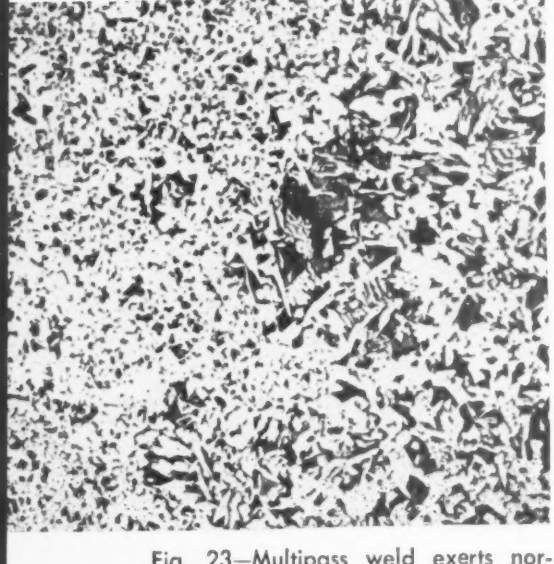


Fig. 23—Multipass weld exerts normalizing effect on heat-affected zone and weld metal in plain carbon steel

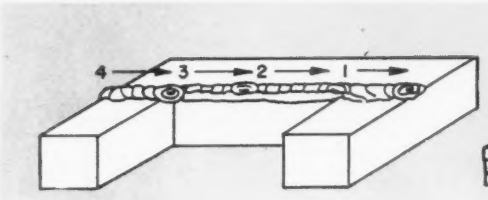


Fig. 16—Backstep sequence welding

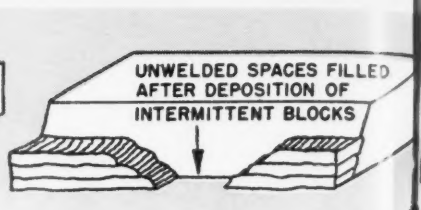


Fig. 17—Block sequence procedure

Shaking Out . . .

Cleaning . . .

Welding . . . Steel Castings

Stress-relief of welded castings, the effect of hydrogen on welds and a discussion of mechanical properties of welds are included in this fourth and concluding article of a series

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

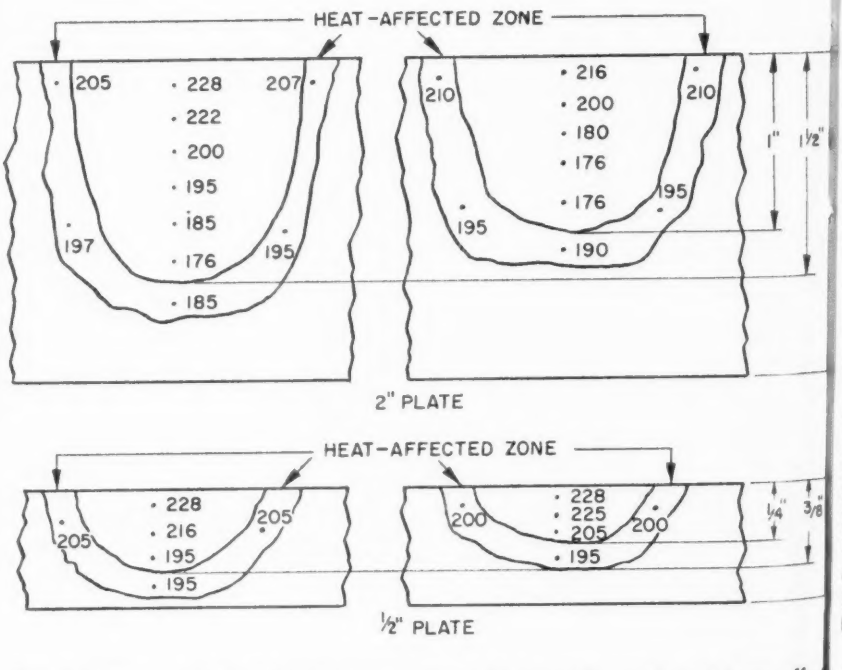


Fig. 24—Cross sectional hardness survey made in weld metal and heat affec zones of major and minor multipass welds, ½ and 2-in. plates, Grade B st

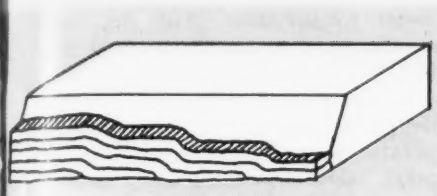


Fig. 18—Steps for cascade sequence

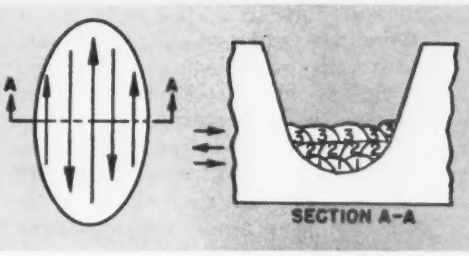


Fig. 19—Horizontal layer deposition

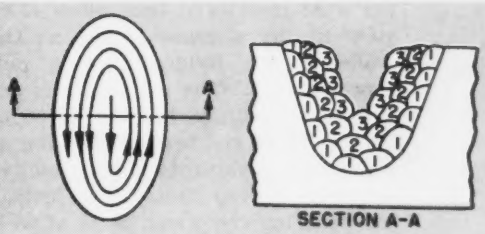


Fig. 20—Deposition in spiral layer

WHENEVER possible, welds should be made "down-hand"—that is, with the surface to be welded in a horizontal position. In working on small castings, this is accomplished readily by setting them in proper position, and turning them over as may be required. To do this with larger castings, they often are clamped on "positioners." In working on really big pieces, it is seldom possible to make all welds down-hand, and some of the metal must be laid on a vertical or steeply sloping surface, or even overhead.

With electrodes of the proper type, skilled welders can lay beads in all these positions, though not as readily as when working down-hand. A vertical seam, naturally, is started at the bottom and carried upward, so that each bit deposited serves to support the metal above it. When welding down-hand, a longer arc and higher voltage may be used than in vertical, horizontal or overhead work. In all cases, the longest arc that will permit proper deposition should be used.

The arc voltage varies directly with the length of the arc. A 14-volt arc such as may be maintained with bare or lightly coated electrodes is about ⅛-in. long, and a 40-volt arc about ¼-in. long. With covered electrodes, an arc calling for from 22 to 40 volts may be held on down-hand welding, whereas 20 to 35 volts is all that can be used in vertical, horizontal or overhead work. Too long an arc is unsteady and erratic in any position, too short a one is impractical.

Contraction Stresses—Heat of the arc and of the deposited metal rapidly raises the temperature of a comparatively shallow layer of the base metal, which therefore expands greatly. Being confined by the cool, unexpanded metal around them, the heated layers move in the line of least resistance—that is, toward the liquid pool of weld deposit. The space filled by the deposited metal, therefore, is narrower than it was before welding began.

As the weld cools, the cavity tends to resume its original size, and therefore to pull away from the filling of weld metal. The latter also shrinks inward toward its own center, thus setting up heavy tensile stresses. Thin sections warp under the pull, thus to some extent relieving the residual stress. When joining two light pieces, it is often possible to set them at a slight angle with each other so that they will "warp" straight. In heavier sections, however, the stress builds up to a high figure, unless steps are taken to prevent it.

One of the standard devices to reduce total contraction in long beads is not to lay them continuously in one direction, but to use the back-step sequence shown in Fig. 16. In this method, sections of bead from 2 to 4 in. long are deposited in the sequence indicated by the figures and arrows in the cut. Either strong or weave beads may be laid in this way.

Several Methods Are Used

In welding up deep grooves in which the metal must be deposited in several successive layers, string or weave beads laid in one direction are satisfactory for comparatively short welds. On longer ones the back-step sequence shown in Fig. 16 is more satisfactory. Two other methods, known as the "block sequence" and the "cascade sequence" are also commonly employed. In the former the weld is built up by forming successive blocks which are subsequently joined together by others, in the manner shown in Fig. 17. This method is chiefly effective in minimizing longitudinal stresses set up in welded castings.

The cascade sequence, shown in Fig. 18 reduces both longitudinal and transverse stresses, as the heat from the first part of any bead warms up the last part of the preceding one; this relieves its stress by permitting it to stretch under the load i.e., the preceding bead is stress-relieved. This effect occurs to some extent in any weld laid down in successive layers.

In the multi-layer of large grooves, any one of the foregoing deposition techniques may be employed. As a matter of convenience it is often simplest to run one bead in one direction and the next one in the opposite direction, as illustrated graphically in Fig. 19. The easiest sequence to follow then is to build up the deposit in longitudinal layers, as shown in the illustration. Some authorities, however, believe that the least stress is set up when the weld can be laid down in spiral layers around the sides of the opening, as shown in Fig. 20.

When it is necessary to use a backing strip to close the bottom of the space to be welded, particular care must be taken to insure good fusion between the first metal laid down and the side walls of the groove. The backing may be a brick, or a piece of metal coated with a heavy clay wash. In some cases where the backing piece is to remain in place as a part of the finished job, the welder must take special pains to insure proper penetration of the backing material and the sides of the groove.

In joining two pieces together, or filling up a space that goes completely through the section, either a single-V or a double-V weld may be made. In the former, the narrowest point is at the bottom of the groove, and the welding is done from one side only. To complete one of these welds, it is desirable when possible to finish the job by laying a final bead from the opposite side. In this way a continuous sound deposit is insured. In a double-V weld, the narrowest point is part way between the top and bottom surfaces. The welding is done first from one side, then from the other, and any imperfections at the bottom of the first bead deposited are melted out and eliminated as the first metal is laid from the opposite side. Other things being equal, double-V welds are to be preferred to single-V ones.

Peening—When no post-welding heat is to be applied to the welded article, the shrinkage stresses in the weld may be relieved by peening each layer of weld metal as soon as it is deposited. This may be done with a hand or air hammer and a blunt-end chisel, or with the peen end of a machinist's hammer. The

effect of the peening is to spread the weld metal and thus allow it to yield to the stresses set up as the walls of the welded opening pull away from it. The metal should not be peened until it has cooled to or below a dark red heat, as peening at higher temperature simply produces a series of deep dents in it, instead of spreading the whole mass of weld metal.

Properly carried out, peening will almost completely eliminate contraction stresses, but good judgment is required on the part of the welder to avoid over-peening, which tends to start cracks in the weld metal. When the welded piece is to be subjected to post-welding heat treatment, as most steel castings are, peening is unnecessary.

Of and by themselves, the stresses set up in welds are usually not serious, though they may at times distort the piece being welded. Then, too, if they occur very early and are of sufficient magnitude, they may cause hot cracks in the weld metal. These cracks originate soon after the metal solidifies, and because of its columnar structure, due to directional solidification, they are more apt to occur in the weld metal than in the adjacent layers of base metal. A high sulphur content in the weld deposit, which makes it weak at temperatures just below its solidification point, increases the tendency to form hot tears.

Even quite heavy shrinkage stresses would not usually be harmful, were they not coupled with other results of the rapid heating and cooling of the base metal close to the weld. A comparatively thin layer of the steel is brought quickly to a high temperature, and is then cooled rapidly as its heat is absorbed by the unheated, deeper-lying layers to which it is integrally attached. The metal that is quickly heated and cooled is thus hardened, just as any steel is when it is cooled rapidly from above the critical temperature range. Thermal stresses of sufficient magnitude imposed upon these hardened layers will cause them to crack at low temperatures.

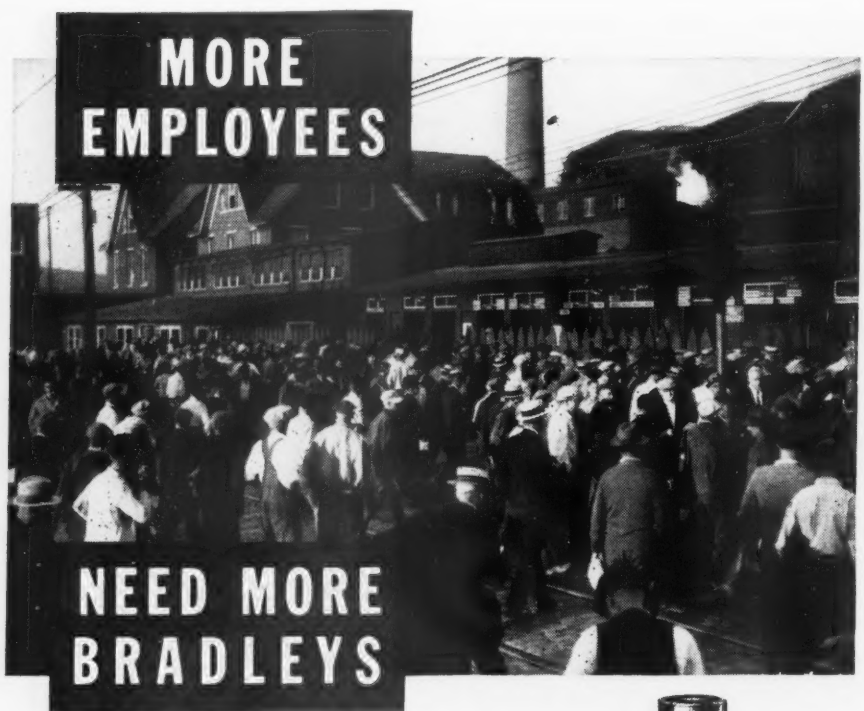
Cold Cracking May Occur

The higher the hardenability of the steel and the faster the heated layers cool, the higher is the hardness produced, and the greater the liability to cold cracking. In general, an increase in the content of carbon and of alloys such as nickel, chromium, vanadium, molybdenum, etc., raises the hardenability and makes cold cracking more likely to occur than it otherwise would.

Over-penetration of alloy steels by the weld metal causes the deposited metal to be contaminated by the base metal and thus to contain considerable amounts of the alloys that increase hardenability. Cold cracking then may occur, not only in the heat-affected zone, but in the weld deposit as well. Similarly, cracks in highly hardenable steels are often initiated by tack welds made to keep the different parts in proper relative position, before starting the weld proper. It can not be too highly emphasized that to make tack welds in hardenable steels is a dangerous practice, likely to lead to failure of the welds in service.

The degree of hardening of the heat-affected zone is also directly related to the speed at which the weld metal is deposited. For a given size of weld bead, the faster the metal is laid down, the thinner the adjacent zone that is raised to high temperature, and therefore the more rapidly it cools, and the higher the resulting hardness. Similarly, a small bead increases the speed of cooling and the hardness of the heat-affected zone, and a large one has

(*Continued on page* 222)



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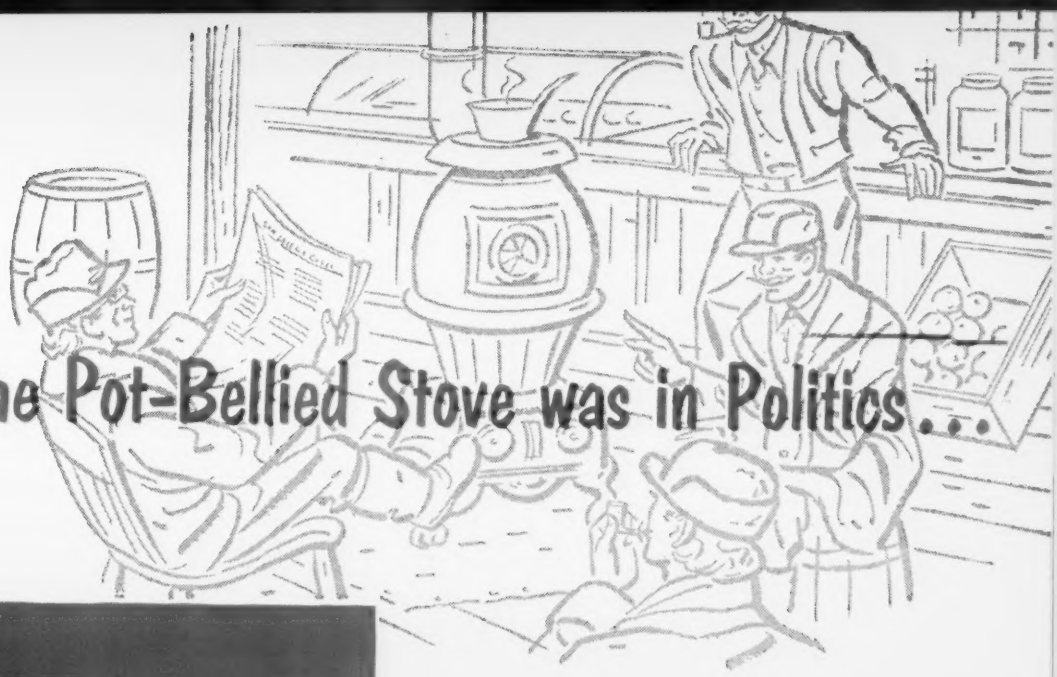

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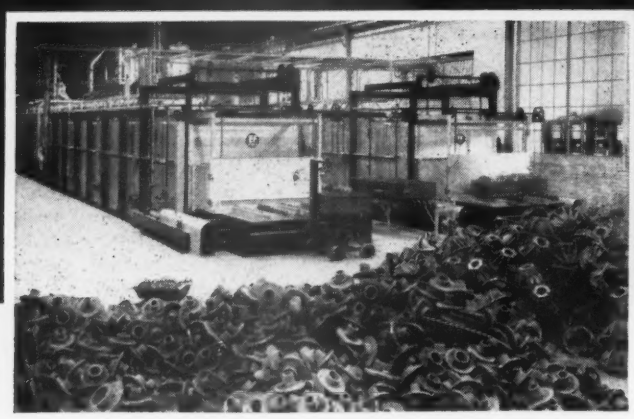

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(*Continued from page* 220)

the opposite effect. For a given size of bead and rate of deposition, the hardness of the heat-affected zone will be higher when the weld is laid in a heavy section than when working on thin pieces. This is because the greater mass of the heavier piece remains colder and cools the heat-affected zone faster than a thin section does.

Effect of Hydrogen—It has been shown recently that hydrogen in the arc atmosphere has an important effect in promoting the formation of cold cracks. The liquid weld deposit absorbs hydrogen, and in cooling retains the gas in solution as long as the metal remains in the austenitic condition, but releases it when the austenite transforms to martensite. In steels of low hardenability, this transformation occurs at a fairly high temperature, when the hydrogen is free to diffuse through the steel and its liberation has no harmful effect.

If the hardenability of the metal is high, however, the rapid cooling of the heat-affected zone postpones the transformation until the temperature has fallen nearly to that of the surrounding atmosphere. The released hydrogen then collects under very high pressure in microscopic or submicroscopic voids in the metal, and starts cracks which are enlarged by the existing shrinkage stresses in the weld. In particular, the type of defect known as under-bend is now attributed chiefly to this effect of dissolved hydrogen. In welding steels of high or medium hardenability at atmospheric temperature, with the types of electrode that evolve much hydrogen, under-bead cracks are almost certain to form.

Preheating the casting before welding has long been the recognized method of offsetting the combined effects of thermal stresses and hardening of the heat-affected zone around the weld. When the steel is heated before welding, the temperature differential between the heat-affected zone and the adjacent layers of base metal is greatly lessened. The contact layers, therefore, cool more slowly, with the result that the internal stresses set up, and the hardening of the metal, are greatly reduced.

Perhaps equally important, the transformation of austenite, and the resulting liberation of hydrogen occur at much higher temperatures, when the hot metal is still comparatively soft, and therefore yields to the gas pressure, instead of cracking. This is probably the major reason why preheating enables the welder

(*Continued on page* 226)

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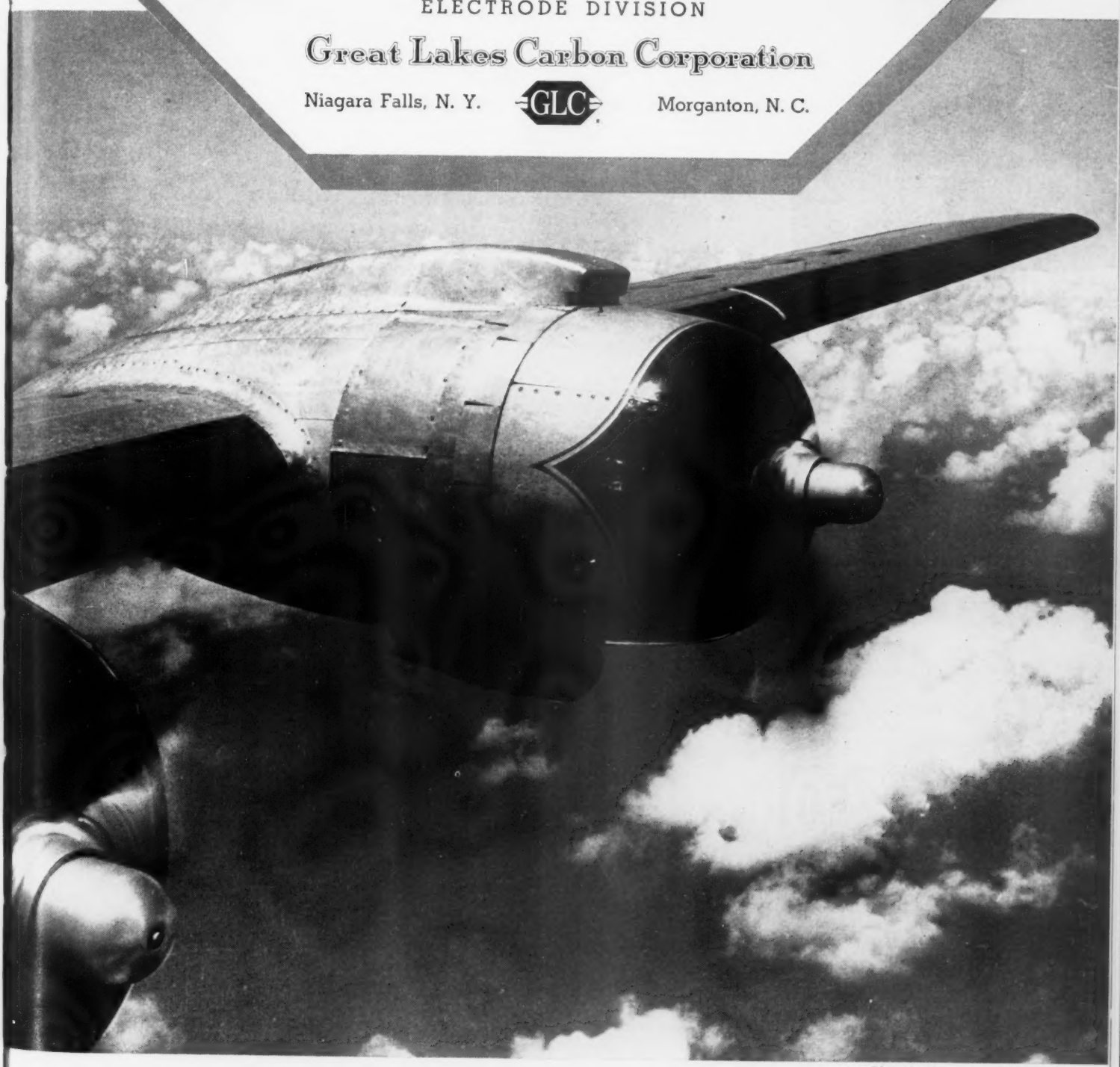

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(Continued from page 222)

to make welds free from under-bead cracks of considerable hardenability.

To hold the proportion of hydrogen in the gases around the arc to an absolute minimum by the use of the new low-hydrogen E XX15 and E XX16 electrodes is perhaps quite as effective as preheating. With these electrodes, it is now possible to make welds at atmospheric temperature that are quite free from under-bead cracks, in steels that formerly had to be preheated to at least 300°F. Alloy steels of still higher hardenability must be both preheated and welded with the low-hydrogen electrodes.

Preheating may be general, in which the whole casting is heated, or local, when only a section around the weld is heated, by means of a gas torch, electric resistance element, or in some other way. General heating is always preferable. In steel foundries, furnaces or ovens are usually available for preheating and should be used whenever possible, because they enable the operator to control the temperature accurately. Small castings, of course, may be heated with torches, or on a coke or charcoal fire, but with these make-shift methods it is hard to control the temperature properly.

Heat Pieces Above Minimum

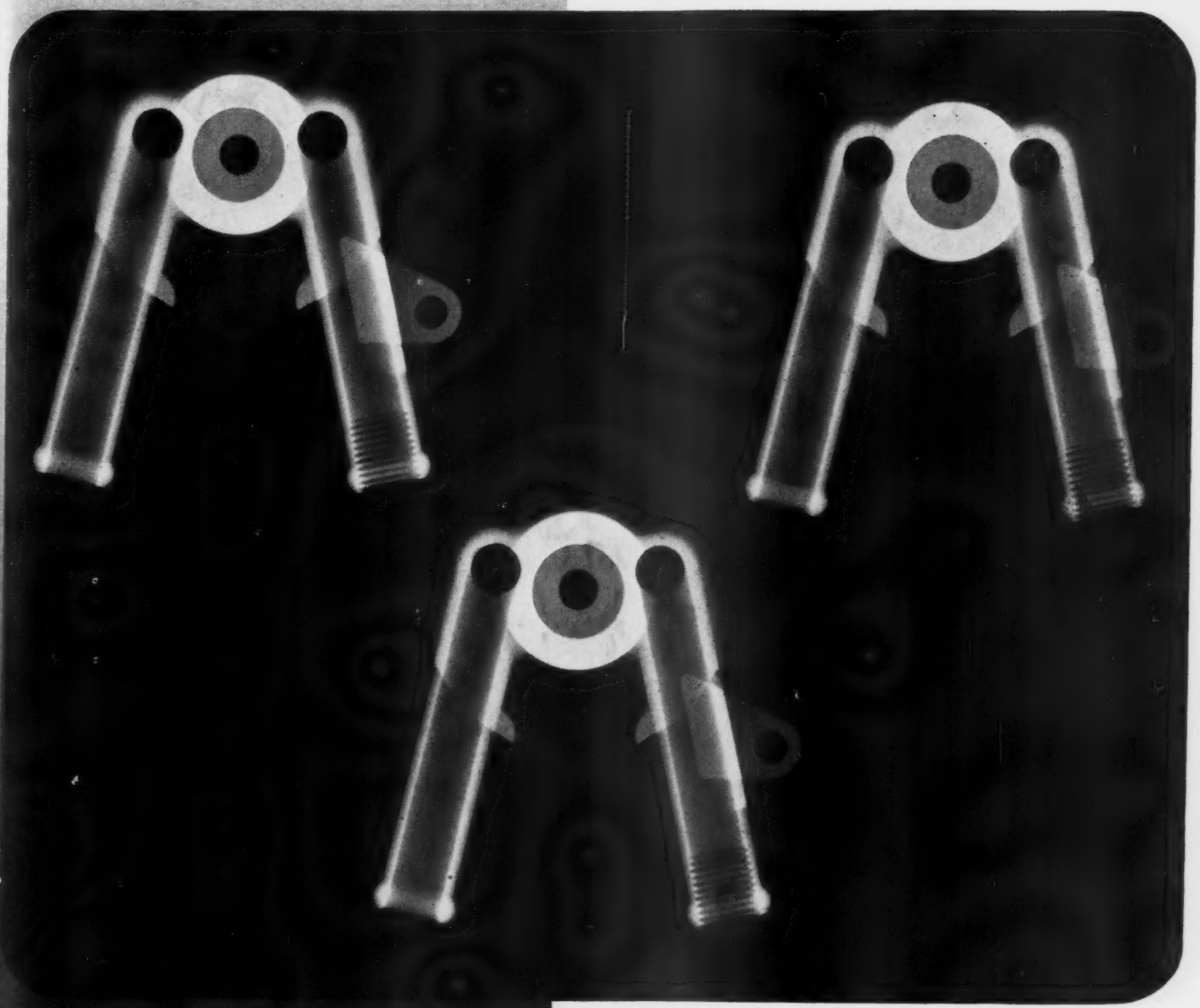
To be sure that welding is completed before the casting has cooled too much, it is generally desirable to heat the pieces to a temperature at least 50 or 100°F above the necessary minimum. If they become too cold before the work is completed, they should be returned to the furnace and brought back to temperature.

Repair welding of large castings often requires so many hours that, if not kept hot in some way, they would cool below the proper temperature long before the work could be completed. To avoid the necessity of repeatedly returning them to the furnace, they should be kept warm by playing the flames of gas or oil torches on them, by means of electric resistance heating elements, or sometimes by setting them on special heating devices containing a number of gas burners arranged to concentrate their flames on the proper parts of the castings. To keep track of the temperature, temperature-indicating crayons that will melt at given temperatures should be used to mark the casting.

In working on really large castings, blankets of asbestos cloth or sheets of asbestos board are generally laid over the hot pieces, partly to help keep

(Continued on page 229)

Radiograph of automotive heater shut-off valve.



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(*Continued from page 226*)

them warm, but largely to keep the welders cool, or as nearly so as possible.

The temperatures used for preheating vary from 200 to about 400°F or slightly over; the higher temperatures are used for steels of higher hardenability, the lower for softer steels. Plain carbon steels with carbon below 0.30 per cent generally do not have to be preheated at all. Some of the low-alloy steels with carbon in that range can also be welded cold; some are best handled with a low temperature pre-heat. With carbon from 0.30 to 0.50 per cent, both carbon and low-alloy steel always need preheating. Too high a temperature should be avoided, because it tends to make the weld deposit boil as it is laid down, and sound welds are produced more easily at lower temperatures.

After welding is completed, castings that required preheating should not be allowed to cool in the air, but should be returned to the oven or furnace or heated to a low temperature in some other manner, and cooled slowly to room temperature. If this is not done, stresses set up in castings of widely varying sections by comparatively rapid cooling in the open air are quite apt to produce cracks in the welds or in the heat-affected zone.

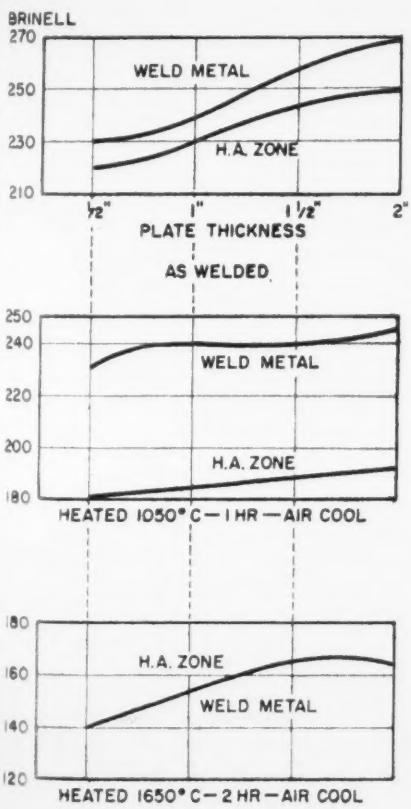

Fig. 25—Effect of section size on hardness of weld and heat affected zone, one-pass weld, grade B steel

Stress Relieving — After welding, all castings except those of low-carbon unalloyed steel should be given at least a stress-relieving heat treatment. This consists of heating to a temperature of from 1100 to 1250°F, and cooling slowly in the furnace. By this treatment, practically all residual stresses are eliminated, and the hardness of the heat-affected zone is so reduced that the steel can be chipped or machined readily without difficulty.

When possible, steel castings of high or medium hardenability should be placed in the furnace in which they are to be stress-relieved as soon as welding is completed. The furnace is kept at or close to the temperature that was used for preheating, and when all the pieces that are to be stress-relieved have been placed in it, they are heated slowly and evenly to the desired temperature, held for the proper length of time, and allowed to cool slowly.

Give Final Heat Treatment

In a great many cases, instead of using stress-relieving, the castings are given their final heat treatment immediately after welding. Generally, steels of medium or high hardenability will have been stress-relieved or at least cooled slowly from preheating temperature, before they are given their final heat treatment. Sometimes, however, it is possible to place them in the furnace as fast as they are welded, just as for stress-relieving, and give the whole batch the final treatment when the furnace is filled.

Porosity in weld metal is caused by failure to allow sufficent time for the escape of gases absorbed from the arc atmosphere, and released as the deposit cools. If the weld metal is not puddled properly as it is laid down, these gases will be trapped in the solidifying steel, and produce small holes in it, just as carbon dioxide "raises" bread by making it porous. A high-sulphur content in the weld deposit or in the base metal creates gases by reactions occurring at welding temperatures, and thus increases the tendency to porosity in the weld.

The gases that cause the trouble may also be absorbed when the weld metal is deposited over sand pockets or spongy places in the casting under repair. The remedy for this, of course, is proper preparation of the area to be welded. Incomplete penetration, undercuts and notches, etc. are caused by poor manipulation on the welder's part, rather than by any inherent characteristic of the welding process.

(*Continued on page 232*)

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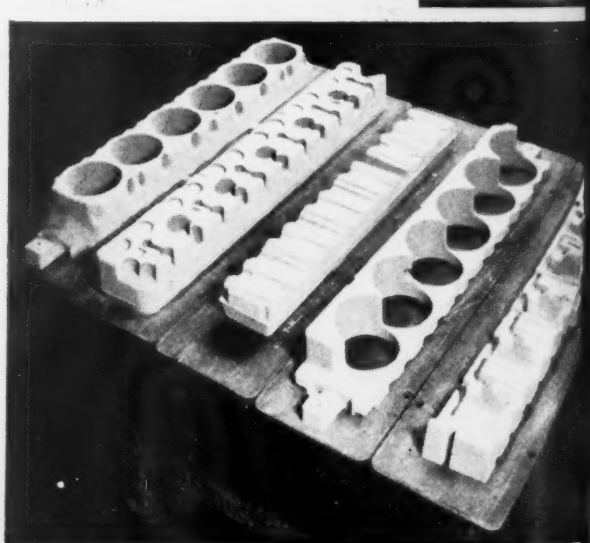

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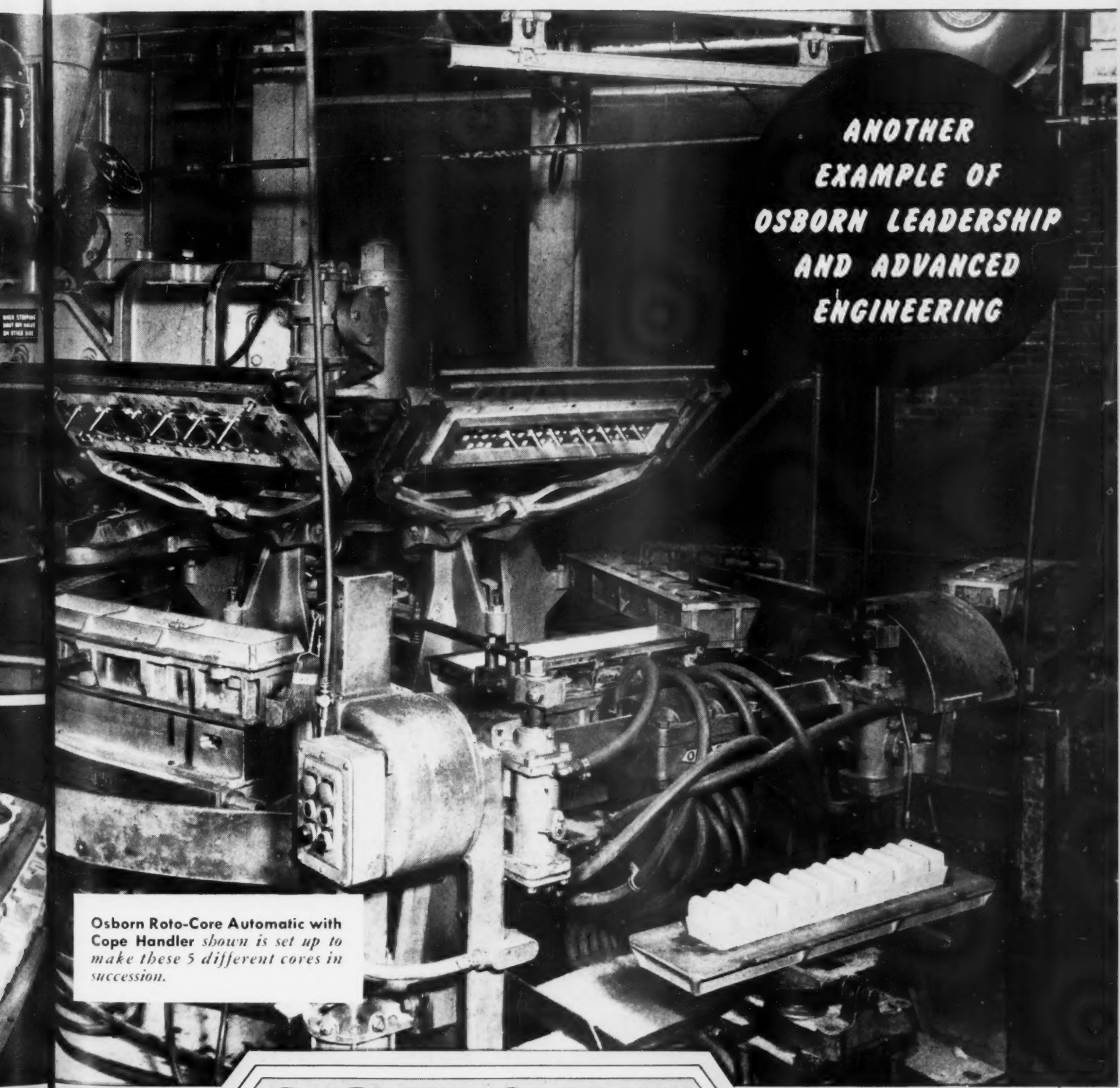

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(*Continued from page* 229)

In one-pass welds in which only one bead is deposited, the weld metal is of uniform hardness throughout, and its hardness and that of the heat-affected zone will vary only with the composition of the steel, the speed of welding, the thickness of the piece and the degree of preheat. Only by preheating or post-welding heat treatments can the hardness of either the weld metal or the heat-affected zone be reduced. This is illustrated in Fig. 25[7], which shows the hardness of one-pass welds in plates ½, 1, and 2 in. thick, in the welded condition, after stress-relieving at 1150°F, and after normalizing at 1650°F. These plates were of class B cast steel, and the welds were made with low-hydrogen electrodes that deposited weld metal with mechanical properties approximately the same as those of the plates.

In multi-pass welds, the heat of each successive layer deposited raises the temperature of those already laid down, and that of the heat-affected zone, enough to considerably reduce their hardness. There is therefore a steady decrease in the hardness of both weld deposit and heat-affected zone, from the top to the bottom of a multi-pass weld. This is illustrated in Fig. 24[7], which shows the hardness in the as-welded condition of large and small multi-pass welds made without preheat in plates of class B cast steel, ½ x 9 x 11 in., and 2 x 9 x 11 in. respectively. At the top, the hardness of both weld metal and heat-affected zone is approximately that of the same locations in single-pass welds. At the bottom of the weld, however, the hardness of both has been markedly decreased. These welds were made with the same low-hydrogen electrodes that were used to make the single-pass welds illustrated in Fig. 25.

Grain Structure Is Altered

Not only the hardness, but the grain structure of the heat-affected zone, are markedly altered in the welding process. This is well illustrated in Figs. 21, 22, and 23[7], which show the microstructures of the welds whose hardnesses are given in Figs. 24 and 25. In Fig. 21, a one-pass weld, the weld metal is at the extreme left-hand side of the cut. Next to it comes the portion of the heat-affected zone that reached a temperature of some 2100° F, which greatly coarsened its grain structure. Next are two zones where the structure of the base metal has been refined by being heated somewhat above the critical temperature range, and at the extreme right is the structure of the unaffected cast steel.

Fig. 22, of a multi-pass weld, shows the effect of successive passes in tempering the metal below them. In this illustration, the weld metal is at the left, the heat-affected zone at the right. At the top of the weld, the coarse grain structure of the highly heated portion of the affected zone is similar to that of the same part of the single-pass weld. Toward the bottom of the weld, however, the heat of the later-deposited layers of weld metal has raised the temperature of the affected zone above the critical temperature range, and produced a thoroughly grain-refined structure.

Stress-relieving below the critical temperature range will not refine the coarse microstructure of the heat-affected zone, but normalizing will. This is illustrated in Fig. 23, which shows the structure of the cross section of one of the multi-pass welds already described, after normalizing at 1650° F for 2 hours. This treatment, of course, not only satisfactorily refines the microstructure, but

(*Concluded on page* 235)

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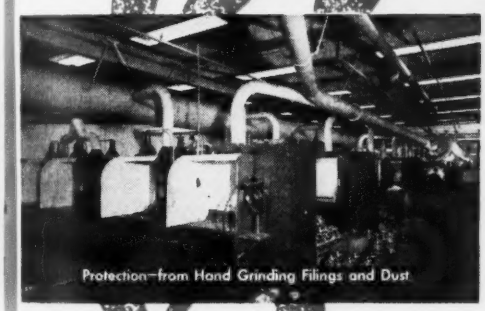

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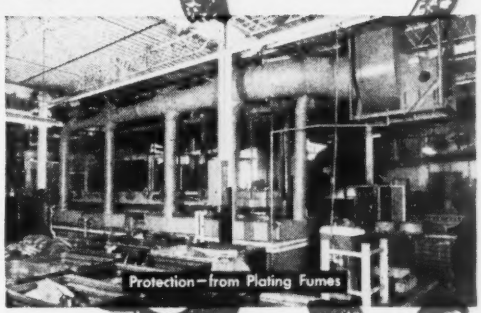

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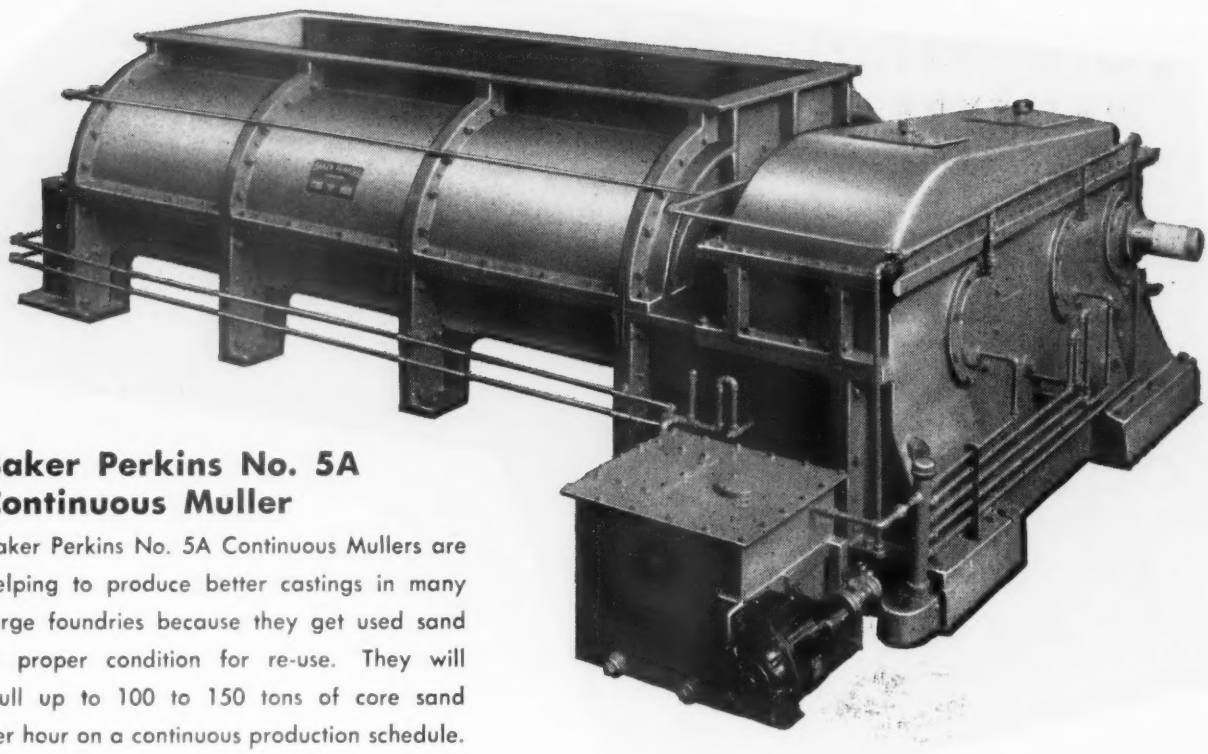

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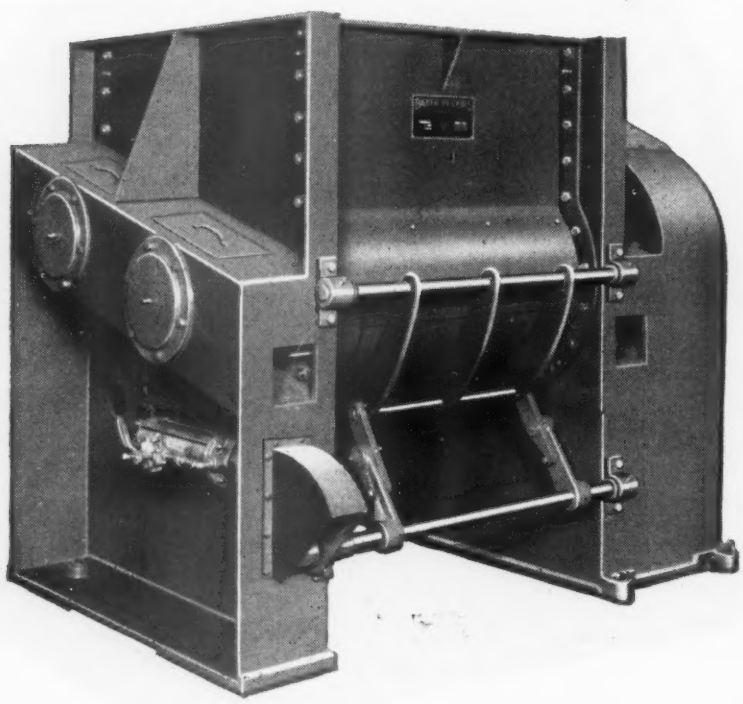

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(*Concluded from page* 232)

lowers the hardness of the heat-affected zone to that of the rest of the casting.

It is obvious from this discussion that it is often quite as important, if not more so, to stress-relieve or heat treat castings in which small welds have been made, as those containing major ones. If this is not done, the hardened zone around the weld will show up if the surface containing the weld is machined, and may start cracks if the stresses in service happen to be concentrated in the portion of the piece in which the weld was made.

Mechanical Properties of Welds—In passing through the arc, the weld metal loses a varying proportion of its carbon content by oxidation. There is also a considerable loss of the more readily oxidized metalloids, especially silicon and manganese. This oxidation loss varies with the length of arc, amount of puddling, nature of coating, etc., and as a rule no two operators, using the same electrode, will lay down deposits of identical analyses. It is difficult, therefore, to produce an electrode that can be depended upon always to give a weld deposit of exactly the same analysis as that of the base metal.

As a rule, quite low carbon steel is used in the core wire, and the weld metal is therefore considerably lower in carbon content than the castings being welded. In a great many cases, this is of little or no consequence, the welds being strong enough to stand up under the stresses to which the castings are subjected in service. When the requirements are more severe, however, it may be essential that the weld metal should have approximately the same mechanical properties as the base metal, so that both will react similarly to the service stresses imposed upon the casting. Because it is difficult always to secure in the weld deposit the carbon content that will give the desired mechanical properties, the strength of the deposited metal is raised by incorporating in the coatings varying amounts of manganese, nickel, molybdenum, vanadium, chromium or other alloys, and thereby laying down an alloy, rather than a plain carbon steel deposit at the welded area.

By suitably proportioning the alloy content of the low-carbon weld metal, it may be given any desired strength and hardness. In choosing alloys for this purpose, preference is given to the less oxidizable ones such as molybdenum and nickel, since the proportions transferred through the arc to the weld deposit are under better control than when readily oxidizable alloys are relied upon. It is in this way, rather than by increase of carbon content, that the high strength is obtained in the deposits produced by electrodes of the E 80XX, E 100XX, and other similar classes.

Electrodes that will produce deposits with mechanical properties equal to those of carbon or low-alloy steels are now available with most of the standard types of coating. Even with proper preheat and carefully controlled welding procedure, however, under-bead cracks are apt to be formed if steels of medium high alloy content are welded with electrodes that evolve hydrogen. To be sure of success in welding steels of these classes, therefore, the low-hydrogen EXX15 and EXX16 electrodes should be used, and in some specifications for high strength heat treated steel castings for special purposes, the use of low hydrogen electrodes is obligatory.

References

1 "Set Up Steel Casting Welding Standards and Procedures," by John Wozny, *American Foundryman*, May, 1951.

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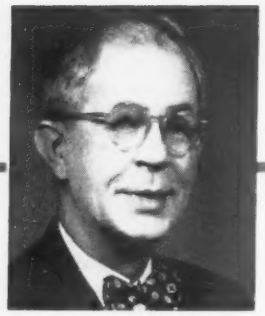


Man-to-Man

By RALPH L. LEE

"Patternmaking in Clay"

New materials, processes and equipment still require a lot of imagination to transform a blueprint into a finished product

AS a rule, I find pattern shops look pretty much alike, and I say this after visiting dozens of them all over the country. In fact, I have a weakness for pattern shops, being sort of a half-baked patternmaker myself and in charge of the patternmaking division of the Lee Hobby Foundry.

Several weeks ago I ran into an exception. The pattern department of the Chautauqua Hardware Corp. over in Jamestown, N. Y., turned out to be different from any I'd been in before, both as to appearance and performance.

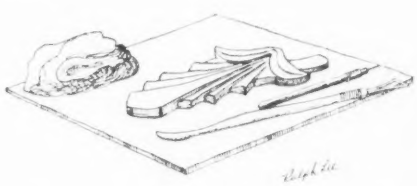
Usually the first step in the trip from a drawing to a casting is taken in wood, and the material and equipment used are just about as nearly standardized as things can be. But in this pattern shop the first step was taken in clay. Without being told where you were, your first guess would be that you were visiting a drafting room or an artist's studio.

Having been raised right across the street from a pottery, and coached by the old master potter while I was a young kid, I have messed around in modeling clay most of my life. So I wasn't entirely ignorant of sculpturing as I visited this shop. But I must say that I never dreamed of clay being modeled with such precision and on such a miniature scale as I saw it being done there.

I watched the modeler—or whatever he is called—working at a drawing table on a most intricate and beautifully decorative drawer pull. If, before this visit, someone had handed me a sketch of it and told me to make a pattern, clay is the last thing I would have thought of, because it is so soft and almost impossible to handle in such slender sections.

My modeler friend overcame this difficulty by building up his clay on a piece of glass with the drawing under it and showing through. The clay stuck to the glass as though it were welded to it and could be handled as a unit. With a rolling pin on pairs of rails of different thickness he planed his pattern lumber in clay, so to speak. He cut out detailed sections to accurate outlines and assembled them just as a wood patternmaker would shape and glue his parts.

After the clay model was finished and with an unbelievably smooth finish, my host explained how, with a soft brush, he slopped plaster all over it (eliminating bubbles) and built up his cast heavy enough to stand the gaff of the operations to follow.



The next step was to pour melted wax into the plaster mold. The wax comes out beautifully, although my host said that he usually does some additional sharpening up and finishing on the wax pattern. Next, the wax pattern with a plaster match (when needed) is cast in fine sand with pattern metal of some sort.

Now we have a master metal pattern which, with additional touching up, used to mold the multiple production patterns. The production patterns are gated together and provided with a hard plaster match; in fact, this combination is used almost exclusively, and I must say that I have rarely seen sharper and finer finish castings at the shakeout.

After my pattern shop visit and trip through the foundry I got so hopped up on clay as a pattern material, and the short and direct path to production, that before I started for home I ordered exactly the same brands of clay and wax my hosts used.

With exactly the same clay and wax and piece of glass, and following their procedure as nearly as I could remember it, I still had one heck of a time trying to get results. I couldn't help but think what a tremenduous step there is between knowing exactly how a thing is done and being able to do it yourself.

I can't kick though, for after one flop following another—which I suspect would have discouraged some people—I came through with a nice pattern for an ornamental pin-up lamp casting. I have a sketch for a letter opener I'm going to sculp in clay just as soon as I can get to it.

While I don't imagine that clay will move into the field of patternmaking to any great extent, I can see places where it can accomplish results that would be much more difficult through other means. Anyway, I have decided to add clay to the already long list of materials on hand in the pattern division of the Lee Hobby Foundry.

However, as I add clay to the list and think back over the exciting new materials proposed for patternmaking, I can't help but think of the strings usually attached to their use. These strings are invariably wound up in the practice a person must follow in experimenting with such materials despite the foolproof instructions printed on their containers or in promotional pamphlets. There just doesn't seem to be any short cut. Which also suggests that, regardless of the advantages of any new wonder-working pattern material, process or equipment, there is not likely to be any automatic way of getting the dope from a blueprint into something you can lift or handle

(Concluded on page 239)

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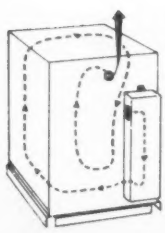

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except through a lot of imagination and painstaking measuring and figuring.

As a half-baked patternmaker who really loves to make patterns, this thought is downright comforting in the light of all these electronic brains we hear so much about.

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"Industrial Development at Home and Abroad—Problems and Prospects" is publication number 101 in the Financial Management Series of the American Management Association, 330 West 42nd St., New York 36.

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The booklet is available from the association at the above address for $1 to association members, $1.25 to nonmembers.

Book Review

Atomic Theory for Students of Metallurgy, 2nd (revised) edition, by William Hume-Rothery, cloth, 331 pages, 6 x 9 in., published by Institute of Metals, London. Price $3.50.

Because he feels that students of metallurgy often lack the background necessary to an understanding of the theory of the structure and properties of metals and alloys, the author designed this volume to provide a bridge to such understanding for advanced students and research workers in metallurgy.

Believing that most books on the subject mistakenly assume knowledge, particularly of mathematics, that is not familiar material to metallurgists, Mr. Hume-Rothery has made the work comparatively self-contained, so that early parts contain some elementary material. In addition, he has made no attempt to deal with mathematical technique. The book restricts itself to those properties for which reasonably straightforward explanations have been provided.

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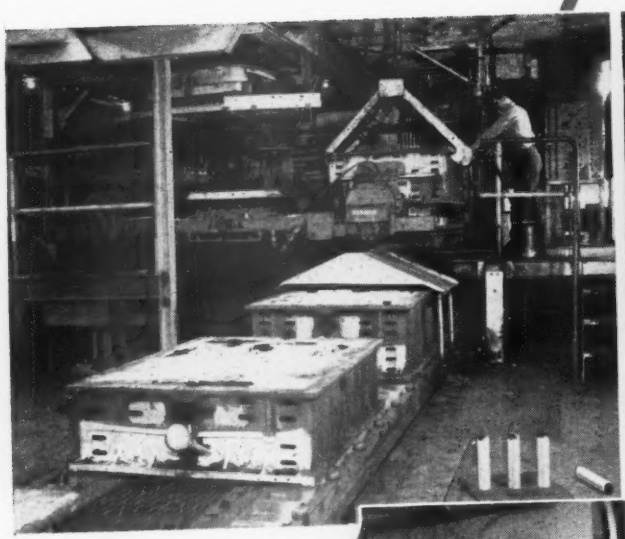

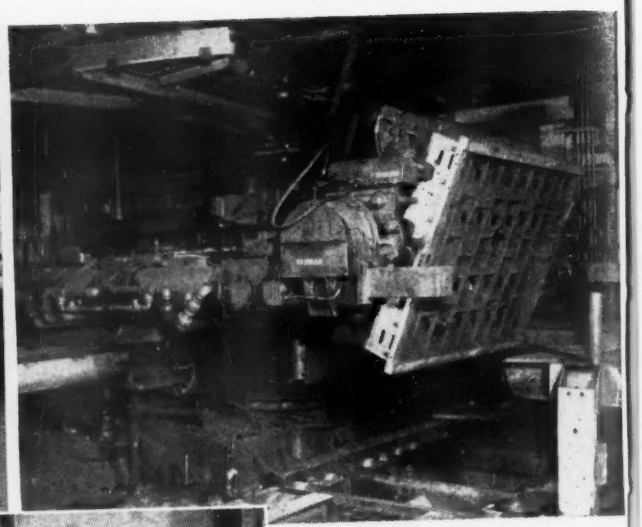

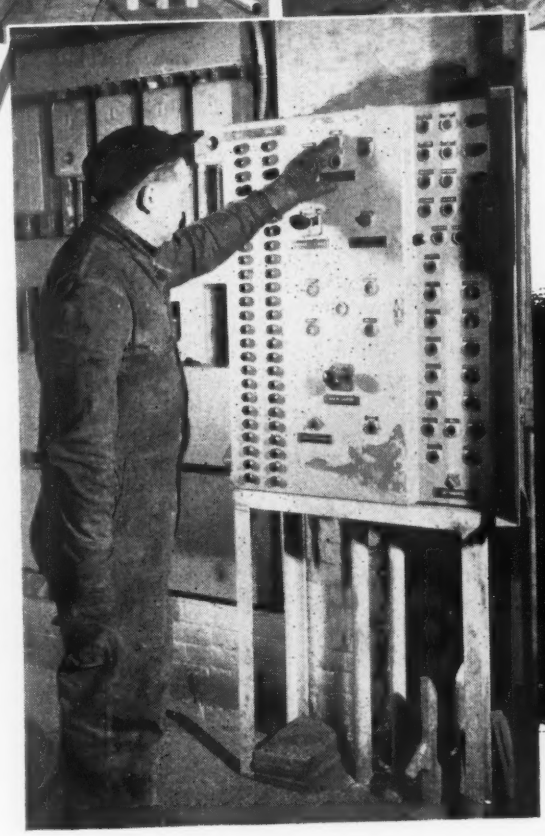

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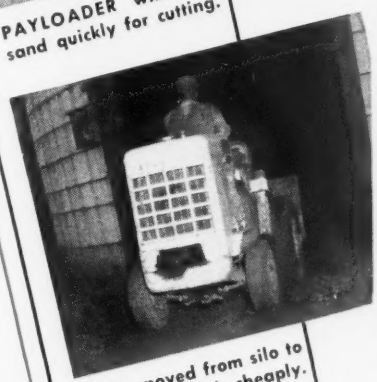

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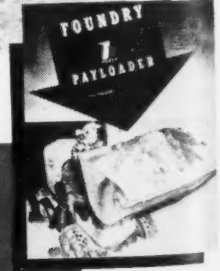

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PATTERNS—Their Relation To Castings Production

Part VII

ABC of Foundry Practice

By T. H. TREVITHICK

IN addition to making allowance for contraction in castings and proper safeguards for shrinkage conditions, the patternmaker also must consider the question of drawing the pattern from the mold. He must provide draft on the vertical faces and (for hand molding) a device and method for loosening and lifting the pattern.

Today a vibrator operated electrically or pneumatically practically has eliminated the old-time rapping bar. In designing castings to be assembled in the rough—that is, without any machine work—the draftsman always should take into consideration the extent to which the mold and the resulting casting are enlarged by rapping or otherwise loosening the pattern.

Where one casting has to fit over another—for example, a ring fitting over a boss or shoulder, or where a lug fits into a cored recess as a hinge on a door or panel—it would be extremely helpful to show the assembled units on the drawing. If this is impossible, the drawing might show the size of the mating parts and the amount of necessary clearance. With this information the patternmaker can make proper allowance for loosening the pattern. In the final assembly the castings will fit into place without expensive chipping and filing. Anticipating the method the molder will employ in drawing the pattern out of the mold, the patternmaker provides the necessary equipment.

A pattern may be in one, two or more parts, depending on the best available method for lifting it out of the mold. The all-important draft factor always is kept in mind in the design and construction of the pattern. After the cope or cover is removed from the mold, the one-piece pattern is loosened by inserting the sharp point of a steel bar in a hole in the malleable iron rapping plate mounted in a shallow recess on the pattern. The molder raps the bar endwise and sidewise with a hammer to loosen the pattern. He then screws the end of an eye bolt into a threaded and tapped hole in the rapping plate. The pattern is lifted out of the mold by hand or with the crane. On large, deep patterns, light steel straps with a toe at the bottom and an eye at the top are let into recesses at the sides or ends of the pattern. They are attached to the crane chains by suitable hooks and adjusted by turnbuckles for uniform strain.

With a split or parted pattern, the mold is separated at the joint and each half of the pattern is loosened and drawn in the same manner. In the event that the cope flask has to be lifted away from the upper part of the pattern, the loosening rod is let down through the cope sand and the pattern is rapped and loosened before the cope is lifted. The method rarely is practiced at present, owing to the widespread use of mechanical vibrators on molding machines and pattern plates.

If a ring pattern is rapped and loosened in a mold, the inside diameter of the resulting casting will be smaller and the outside diameter will be larger than the diameter of the pattern. Dry sand cores withdrawn from coreboxes are subject to the same conditions. Since the corebox has to be rapped before it is removed, the core is reduced in size to some small extent. In some cases a coat of blackwash makes up the discrepancy. In many other instances the core swells slightly during the baking period.

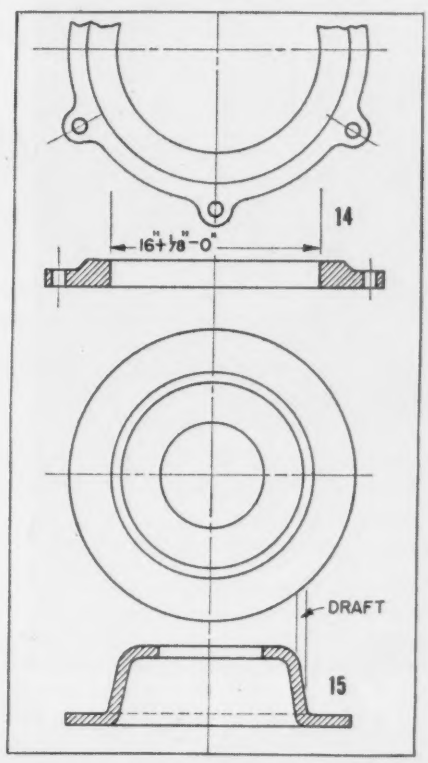

Fig. 14—Allowance indicated on a pattern to compensate for rapping

Fig. 15—Draft allowance for easy drawing of pattern should be shown

With hand rapping, the amount of loosening is somewhat indefinite, since it depends on the molder and how hard the sand is rammed. Obviously, a pattern in a tight, hard-packed mold will require more loosening than a similar pattern in a mold where the sand is not rammed to the same density. Average draft allowance is approximately ⅛-in. per ft on all vertical surfaces.

Machine molding produces more uniform castings than hand molding. All ramming and loosening is done automatically and mechanically. The sand may be squeezed in the flask, packed by jolting, or rammed by a machine that performs both functions and, in addition, rolls the mold over and draws the pattern. The sandslinger operates on an entirely different principle. A constant stream of sand is thrown by centrifugal force around a pattern in flask or pit, packing the sand to any required density. Obviously, a pattern properly drafted will require less rapping or loosening than a pattern with little or no draft.

From the foregoing description it is apparent that the patternmaker must not only make a pattern that may be drawn from the mold in an easy and practical manner, but in many cases must also allow for the necessary loosening of the pattern in the sand before it is removed. The designer can help materially by showing a draft on the drawing, also by giving complete information on parts that must fit in the rough state. Since a great deal depends on the type of pattern, it would be difficult to name a standard rapping allowance. However, as a partial guide it would be safe to assume that a ring

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from 12 to 18 in. inside diameter, 2 in. thick, hand molded would be, in addition to the normal contraction, from $\frac{1}{16}$ to $\frac{1}{8}$ in. less in diameter than the pattern even with the regular draft allowance.

In a typical example, a ring (Fig. 14) was designed to fit over another part with no machining. The ring was to serve as a gland, also as a supporting member and a means for tightening a gasket or packing. A first-class pattern was made to meet production requirement of several hundred castings. The designer allowed $\frac{1}{8}$-in. total clearance, or $\frac{1}{16}$-in. all around the inside circle. This was just the amount that was lost in rapping the pattern, however, and the castings could not be assembled without machining. The drawing was changed to read + $\frac{1}{8}$" — 0.0" in the fit dimension. Stock was removed from the pattern and the resulting castings were perfectly satisfactory.

The patternmaker is trained to work to the drawing. His experience prompts him to make draft allowances, but he hesitates to deviate from given dimensions. Unless he is informed that a rough fit is required, the chances are he will make no allowance.

Draft, or a slight tapering shown on the drawing, and if permissible on the casting, eliminates any doubt in the mind of the patternmaker. In any event, there is no need for him to inquire of the drawing office for information. If made perfectly straight on the side wall, the pattern shown in Fig. 15 would retard molding time. Draft on this and other somewhat similar patterns should be very liberal since it does not affect the utility, the appearance, or the purpose of the casting.

Machine Finish—Amount of stock allowed on castings for finish is governed principally by the kind of finish required. This feature should be shown on the drawing. Except in special cases the designer allows the patternmaker to decide on the proper amount of stock to be removed in the finishing operation. In many instances the amount is the result of a joint consultation between patternmaker, foundryman and machinist.

In deciding on the necessity of finish and the particular type of finish, the designer should be familiar with the kind of surface to be expected on a rough casting, and at any given point or area on the casting. In some instances finish might be eliminated if the designer knew it was possible to produce a fairly smooth and true surface on the rough casting, or that a certain hole or slot could be cored fairly accurately. In

(Continued on page 246)

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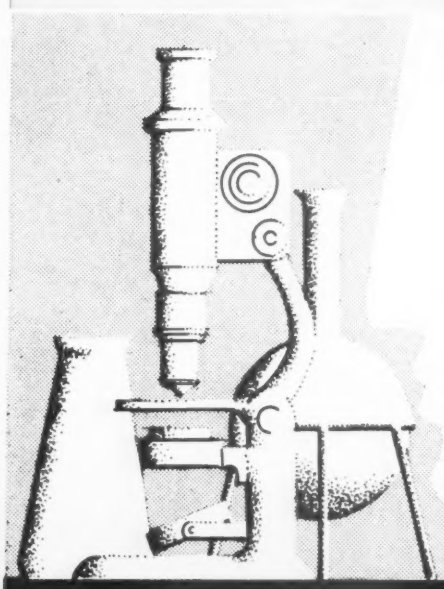

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Photo courtesy of Supreme Brass & Aluminum Foundry, Los Angeles, Calif.

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Check your loose and metal gated pattern equipment now!

TAMMS INDUSTRIES, INC.

228 N. La Salle St., Chicago 1, Ill.

(*Continued from page* 244)

other cases the designer would have to specify a machining operation if he was satisfied that a rough or poor surface inevitably would appear on the casting. To a large extent, the final cost of producing the finished article depends on his judgment.

Different forms of molding and their effect on the appearance and soundness of castings have been discussed in previous installments of this series. Familiarity with this subject should be helpful in arriving at a decision on the amount of finish necessary on a casting.

It is not part of a patternmaker's duty to question in any way the necessity for finish allowance on any area of the casting. He has been taught to work to the drawing. He adds an allowance for finish wherever an *"f"* appears on the drawing. Unless definitely instructed by competent authority, he is responsible for the amount of finish he puts on. In this respect he is guided by the size of the casting, the casting material and by the position of the various surfaces in the mold.

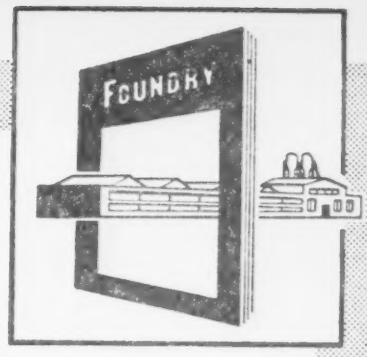
Finish allowance varies from 1/32 in. or less up to 1-in. or more in extreme instances. To take care any slag or dirt that may come to the surface in the cope or upper part of the mold, an extra allowance is put on that part of the pattern. This cannot be termed a regular finish allowance, but rather a provision to insure soundness. In the natural order any gas or foreign material rises to the top of the molten metal in the mold. Where any machining is necessary on the cope face of the casting, extra stock is placed on that part or parts.

The drawing always should show the kind of finish required. The various types of finish and methods of showing them on the drawing are established in drafting room practice. While many plants have special manuals for their employee's guidance they vary but slightly. The same general standards are recognized universally. They may be classed as machine finish, rough finish, grind finish, rough grind, file and broach finish.

For machine finish, the patternmaker allows enough stock to insure a clean and true surface when the casting is finished by a machine tool. Rough finish stock is removed only to insure maintenance of indicated dimensions. In many cases this is merely removal of unevenness or high spots on the casting surface.

Where grind finish is specified, only enough stock is provided to in-

(*Continued on page* 249)



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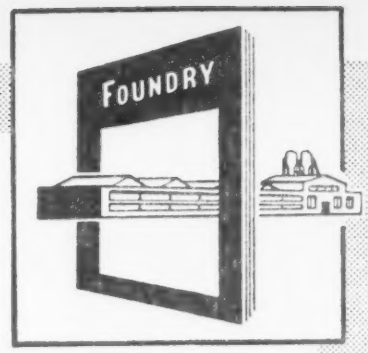

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(*Continued from page 246*)

sure a smooth and true surface by grinding. In a general way rough grind resembles rough finish. In one instance the high spots are removed by grinding, while in the other method the extra metal is removed by a machine tool. Preferred method depends on the amount of metal to be removed.

For file finish the pattern is made "full" to size and every precaution is taken to insure a smooth surface on the casting. For a broach finish in a rectangular hole, the accurately made corebox has an allowance of approximately 1/32-in. extra metal to be removed by the broach.

Except in bores under 2 in. in diameter, the regular machine finish is allowed. Usually it is more economical to omit cores in small holes. In some cases a core is essential to promote uniformity of thickness in the surrounding casting, with consequent elimination of a shrinkage cavity at this point.

On small brass and malleable iron castings 1/16-in. usually is sufficient for machine finish. For gray iron castings up to approximately 12-in. overall, ⅛-in. is the standard allowance for machine finish, with a proportionate allowance per ft as the size increases. On cast steel subject to greater shrinkage, a more liberal allowance is made for finish. The general rule is the difference in contraction per foot — approximately 1/16-in per foot more than for gray iron.

Position of the finished surface in the mold exerts an important influence on finish allowance. All cope surfaces require more finish than those in the drag. Under normal conditions the drag face of the casting invariably can be depended upon to contain denser, cleaner and sounder metal.

If two castings are alike except for finished dimensions—as in the diameter of a wheel, where the overall size is determined by finish, and where all rough casting dimensions are equal—the maximum size often can be given on the drawing in the form of a dotted line. This indicates that one pattern will serve for both castings. The patternmaker builds the pattern to finish to the outside or maximum size. However, the practice is not recommended, except perhaps with due caution and moderation in an emergency.

Tool clearance—sufficient space to permit the cutting tool to start and complete a cut—must be provided by the patternmaker. Since these areas appear where portions of the

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casting project from the adjoining finished surface, they should be noted and shown on the drawing. In this manner the patternmaker cannot ignore them. Excessive and unnecessary hand chipping might be eliminated in the machine shop were this rule carefully followed. Without having his attention directed to this feature, the patternmaker may overlook it. Also, while his experience indicates the necessity of providing tool clearance, he may hesitate or actually skip the item under the shop rule of working strictly to drawing.

Designer and patternmaker should incorporate every possible detail on the pattern to facilitate easy and efficient machining. Lugs for clamping the casting to the planer bed, bosses for centering on lathe or boring mill, and vertical or horizontal areas in the form of small bosses for starting drilling operation on a beveled surface add a great deal to the speed or efficiency of setting up the casting in the machine shop.

This detail should not be left to the patternmaker's judgment. Wherever possible, these temporary additions should be shown on the drawing, say in the form of dotted lines to indicate they have no place on the finished casting. Drawings are made for the purpose of giving clear and concise information to men in the work shops. The basic idea in the draftsman's mind should be to make the drawing in a manner to be interpreted readily, contain all the essential information, and yet be free from elaboration and unnecessary data.

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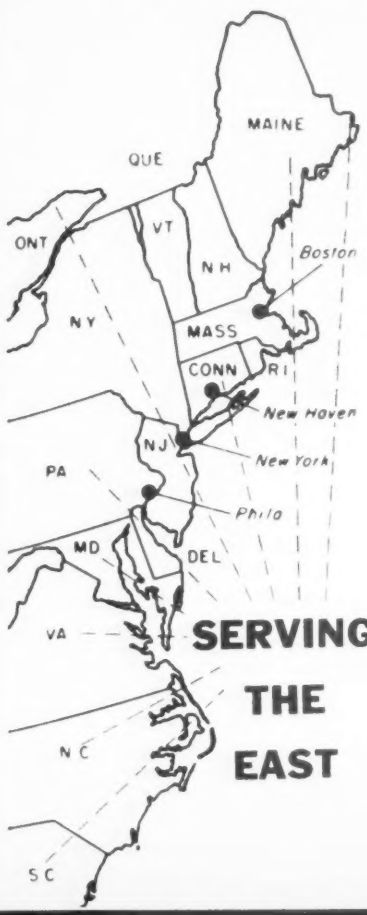

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Quality Control Society Will Meet May 27-29

Seventh annual convention of the American Society for Quality Control will be held May 27-29 at Convention Hall, Philadelphia. In addition to the most diversified technical program yet offered at these conventions, the meeting will include an educational program, exhibits, a ladies program, plant tours, a social evening, a book booth where volumes on quality control and related subjects will be on sale and other features. General chairman is William J. Masser, General Electric Co.

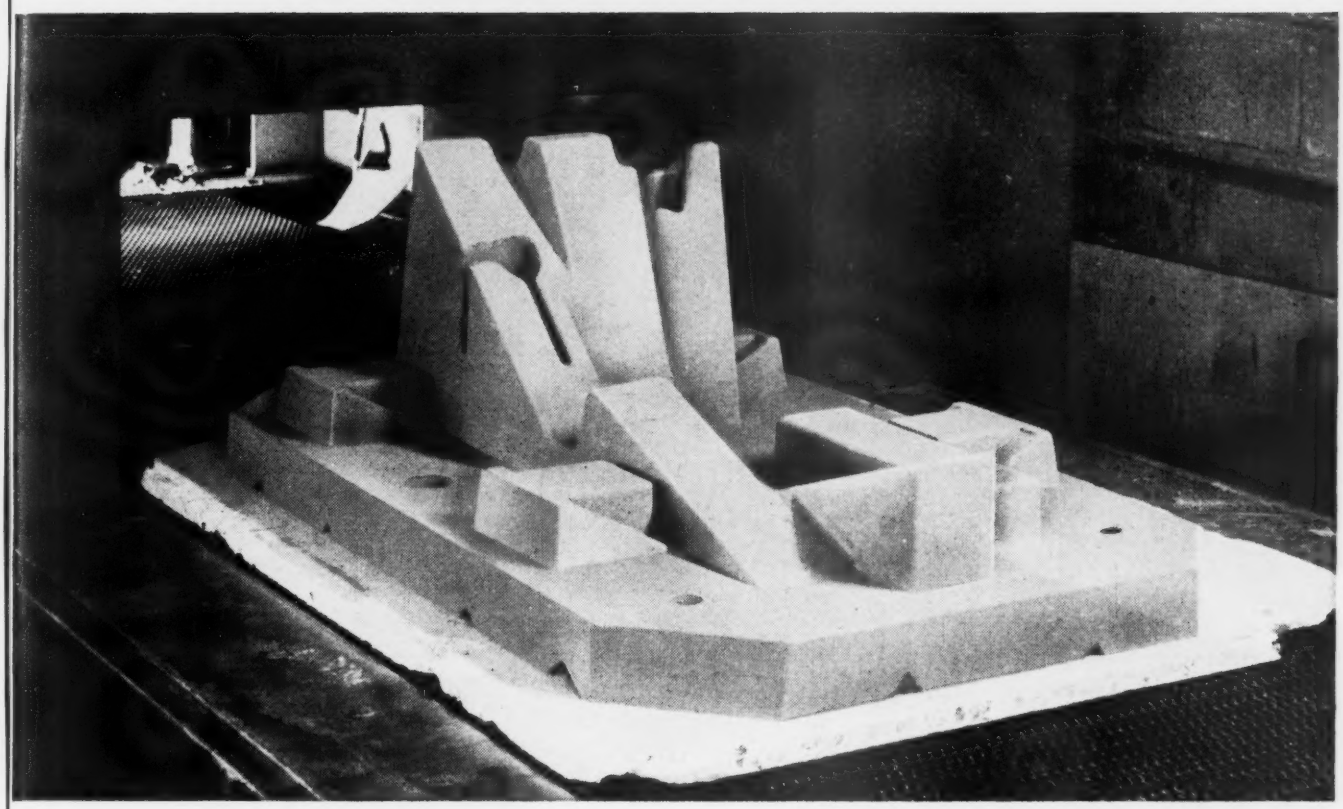
Nearly 40 papers on subjects ranging from those of general interest to such more specialized areas as metals inspection and engineering and quality control will be presented at five simultaneous technical sessions. Plant tours to the Quartermaster Depot, Ford Motor Co. and Budd Co. will be held during the fifth technical session period, 2:30-4:30 p.m., May 29.

Further information about the meeting and registration procedures can be obtained from J. V. Hart, registrar, P. O. Box 5227, Philadelphia 26.

Book Review

Engineering Manufacturing Methods, by Gilbert S. Schaller, cloth, 613 pages, 6 x 9 in., published by McGraw-Hill Book Co., New York. Price $7.

Fundamentals of founding, machining, welding, hot and cold shaping, thermal treatment, engineering materials and the latest technological developments are covered by the author. In addition, he has included a discussion of economic aspects of engineering manufacture, showing the importance of modern manufacturing thinking where costs predominate. Manufacturing methods are integrated with the engineering educational program so that they are presented as a vital part of engineering manufacture, not as an isolated subject.



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If your problem is to eliminate unpleasant odors at the muller or core making station – or a production bottleneck – Resimene 970 can solve it. Why not send for full information today? The coupon is for your convenience.

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Lytron 886 Sand Conditioner . . . Another Monsanto development for the foundry. In sand casting, Lytron 886 sand conditioner produces units with superior finish, requiring less clean-up. Lytron 886 reduces rejects, simplifies sand moisture control.

Resimene, Lytron: Reg. U. S. Pat. Off.

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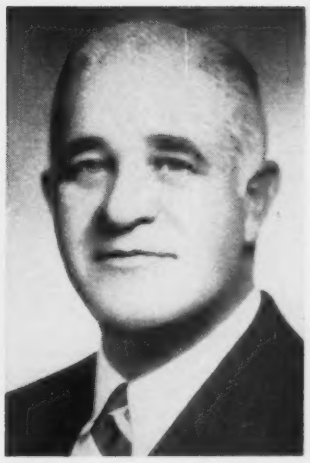


ARTHUR S. BREITHAUPT
Executive Committee Member

Steel Founders' Society
Holds 51st Annual Meeting

By FRANK G. STEINEBACH
Editor, FOUNDRY

PROGRAM for the annual meeting of the Steel Founders' Society of America, held at the Edgewater Beach Hotel, Chicago, Mar. 17-18, featured reports of society activities and consideration of problems of industry. Approximately 300 top management, sales, scientific, technical and operating executives of the steel castings industry attended the meeting, which marked the 51st anniversary of the society.

Announcement was made of the election of A. J. McDonald, vice president in charge of the Washington office of the American Steel Foundries, as president of the society. Mr. McDonald served as chief of the Castings Section, Iron and Steel Division, National Production Authority, until recently. Prior to representing the ferrous foundry industry in Washington, he was in charge of American Steel Foundries' industrial steel castings and automotive division sales.

Carl F. Barchfeld, sales manager, Commercial Steel Castings Co., Marion, O., was re-elected vice president, and R. G. Parks, controller, National Malleable & Steel Castings Co., Cleveland, was re-elected treasurer. Arthur S. Breithaupt, vice president and sales manager, Dodge Steel Co., Philadelphia, was re-elected a director and executive committee member to serve with the president and vice president.

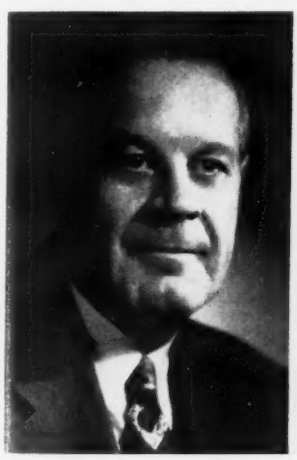
Others elected to the board of directors are: A. T. Carter, secretary-treasurer, Tonawanda Electric Steel Castings Corp., North Tonawanda, N. Y.; J. M. Kincaid Jr., president, Kincaid-Osburn Electric Steel Co., San Antonio, Tex.; R. A. Wahl, sales manager, Union Steel Castings Division, Blaw-Knox Co., Pittsburgh; A. M. Slichter, president, Pelton Steel Casting Co., Milwaukee; P. V. Spooner, president, Missouri Steel Castings Co., Joplin, Mo., and W. P. McGervey Jr., president, Hanford Foundry Co., San Bernardino, Calif.

Henning A. Forsberg, vice president, Continental Foundry & Machine Co., East Chicago, Ind., and retiring president of the society, was awarded the Lorenz Memorial Gold Medal in recognition of his unselfish contribution of time and effort over a long period of time in the general interest of the industry.

Award of the society's national Technical and Operating Gold Medal was made to G. A. Lillieqvist, research director and chief metallurgist, American Steel Foundries, East Chicago, Ind., for his exceptional service in fundamental research and his important contributions in the development of cast armor, specifications, steel making and heat treating methods, and welding properties and techniques.

John A. Rassenfoss, assistant research director, American Steel Foundries, East Chicago, Ind., received the annual *Steel Foundry Facts* first prize award for excellence

RECIPIENTS OF SOCIETY AWARDS



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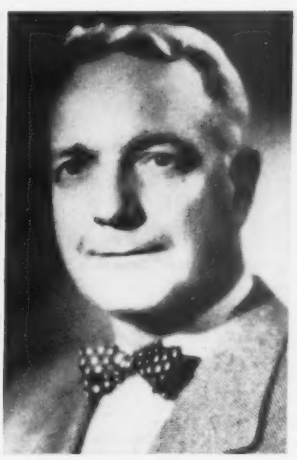

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of his exhaustive technical paper, "The Effect of Casting Design and Metallurgical Variables on Hot Tear Occurrence in Steel Castings," published in the March, 1952 issue of the society's publication. Second prize was shared by C. B. Jenni, chief metallurgist, General Steel Castings Corp., Eddystone, Pa., and K. S. Howard, who retired as vice president of that organization in 1952 and now is assistant vice president, Canadian Car & Foundry Co., Montreal. This paper, "Sand Reclamation at the Eddystone Plant," appeared in the February, 1952 issue of *Steel Foundry Facts*, and also was presented in the September, 1952 issue of FOUNDRY.

In opening the first session, President McDonald reported that NPA is in the process of decontrol, and that controls which remain by June 30 will be greatly modified. The Controlled Materials Plan will be shifted to the Defense Materials system, which will give assistance to direct defense and the atomic energy program, but will give little help to defense-supporting production. Omission of the latter category may cause the foundry industry some future difficulty.

Plan Work Expansion

In discussing the program of the society, Mr. McDonald stated he marveled at the number and broad scope of activities. He indicated that emphasis during the year will be placed on expansion of work of the following committees: Safety; Technical and Operating; Budget, Advertising and Public Relations; Technical Research; Product Development; and Education. Mr. McDonald also paid tribute to the advisory committees to the Office of Price Stabilization and the National Production Authority for their excellent service to the steel castings industry as its representatives.

F. Kermit Donaldson, executive vice president, reported that the society has 147 members operating 161 foundries, and that 17 foundries are affiliated through the Steel Castings Institute of Canada. This represents 90 per cent of the commercial capacity of the industry. Mr. Donaldson reported on a study recently made to determine the effectiveness of the society's promotion material. Results indicate the material is reaching the proper people and is doing the job intended.

Mr. Donaldson's report also showed that production of steel castings for defense requirements and normal civilian needs of more than 100 heavy industries was sustained at near-record level through 1952. National

(*Continued on page* 256)

AT INTERNATIONAL HARVESTER MILWAUKEE WORKS

CRANE TURBO-DRIVE

proves it can't be beat

FOR LOW-COST SAND HANDLING

Saves time, space and manpower... with efficiency no other sand transporting system can equal!

• In the Milwaukee Works foundry of International Harvester Company, a Crane Turbo-Drive system is fast warming up to another spectacular record of savings. The foundry is on a 24-hour, 3-shift basis and handles six different sand mixes daily. Ten core blowers were involved in the change-over. But here is the simple arithmetic that speaks for itself—

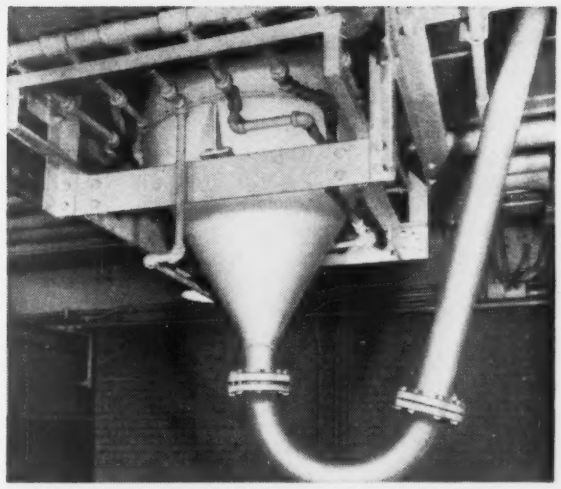
	Total Manpower to Operate 3 Shifts	Sand Delivery Time From Mixers to Core Blowers
OLD SYSTEM	7 men—3 on mixers, 3 conveyor operators, plus one part-time utility man	1200-pound batch in 3 to 4 minutes
NEW TURBO-DRIVE SYSTEM	3 men— one for each 8-hour shift	1200-pound batch in 60 to 90 seconds

HOW CRANE TURBO-DRIVE WORKS

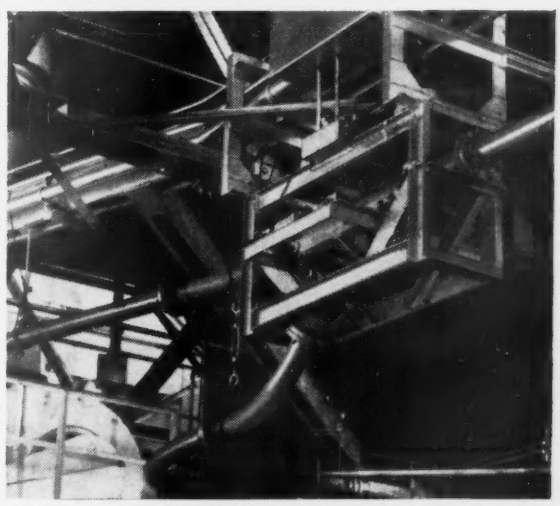
In this typical installation, the Turbo-Drive unit is installed directly beneath the mullers. At the flick of a switch, the muller operator sends a 1200-pound batch of core sand by air pressure through 4-inch steel piping and remotely controlled switches to whatever station needs sand. It's all done in seconds—and in complete safety.

The steel piping need not follow a straight course—it can go up or down, around corners, through walls—inside or out. There are no ponderous machines involved—no major maintenance. And because the Turbo-Drive system is completely sealed from mixing point to core blowers, plant cleanliness is promoted.

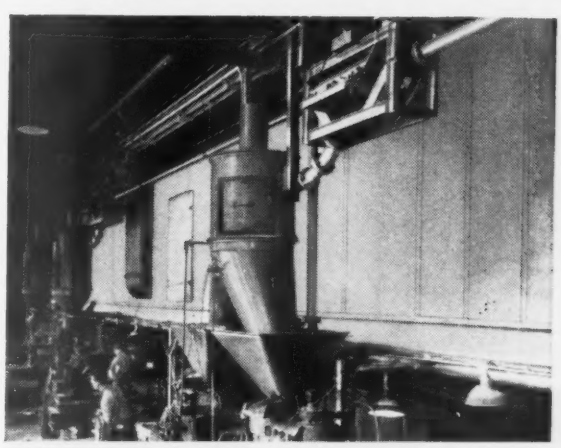
As for initial cost, Turbo-Drive is substantially lower than any other equivalent sand transporting installation. For further information, use coupon below.



Turbo-Drive unit that sends sand batch to destination in seconds. Unit is 15 cu. ft. capacity. Also in 7 and 30 cu. ft. models.



Any number of these single-transfer switches can be used. Turbo-Drive piping can be hung from rails of old system.



The real pay-off with Turbo-Drive — steadier production at core blowers.

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Branches and Wholesalers Serving All Industrial Areas.

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

CRANE CO., Turbo-Drive Division
836 S. Michigan Ave., Chicago 5, Illinois

Gentlemen: Yes, I would like Turbo-Drive literature ( ); please have a representative call ( ).

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

(*Continued from page* 254)

production for commercial use is expected to total near 2 million tons, when all statistics are available.

Charles W. Briggs, technical and research director, outlined the research program of the society since its inception ten years ago. During that period the organization has embarked on 37 research projects and has issued 28 reports. These projects have fallen into three general types: 1—To increase the knowledge of cast steel among engineers, purchasing agents, students and foundrymen; 2—To improve the product; 3—To lower production costs.

Projects designed to increase knowledge include studies on heat treatment, impact, mechanical properties of low-alloy cast steel, grain size of cast steel, influence of welding on cast steel, reproducibility of results of tensile tests, machining of steel castings, and boron-treated steels. Those directed toward product improvement include the flow of molten steel in sand, sand reclamation, control of solidification, pressure feeding, surface finish, riser efficiency. Projects directed toward lowering costs include studies of neck-down risers, properties of core oil and binders, riser compounds and metal removal.

Studies now under way include: Distance risers feed; comparative characteristics of steel castings and weldments; endurance properties of various cast steels; flowability of molding materials; deoxidation and desulphurization of cast steels; steel foundry sand; whirl gates; pressure blasting; substitute cast steels; use of rare earths in cast steels.

In conclusion, Mr. Briggs made the startling statement that the research thus far completed has been for yesterday—to find out things the industry should have known 10 or 15 years ago. Some research is being done for today, but no research is being done for tomorrow. While research for tomorrow probably would be considered as impractical in the light of present day thinking, the speaker assured the members that such research would be most profitable when we arrive at tomorrow. While great things have been done in the last ten years, possibilities can be even greater in the future.

Edgar C. Hummel, president and general manager, Utility Steel Foundry, Los Angeles, stated that managers of business are facing a challenge in retaining the loyalty of their employees. He indicated that management must determine what policies, conditions and practices are best for both company and employees, and then endeavor to confine the activities of the union within that framework. While a different climate for labor management relations has been brought about, the task of restoring a balance will not be easy.

Speaking on "The Taft-Hartley Law—Past, Present and Future," Fred A. Hartley, former congressman and co-author of that act, defended it as a very moderate approach to many complicated problems. In his opinion there has been too much talk about amendments and repeal and not enough about the good that has been accomplished through the act. He emphasized that the Taft-Hartley Act did not repeal the Wagner Act, but took all of the good features into the new act. Mr. Hartley then outlined some of the possible changes in the act which may be made by the present Congress. In conclusion, he stated that the act protects the right of every American to work, and this protection must be continued regardless of changes in the act.

Future plans of the Product Development Committee point to greater emphasis on both customer education and quality of product. James H. Lowe, product development engineer of the society, stated that proper education of the customer will minimize problems of both sales and production. He pointed out that this factor of design is all important since it determines the type of fabrication. While all designers are educated in the fundamentals of fabricated design, too many must design for the casting process by educated guessing. Proper information in the hands of designers will help to ease this problem.

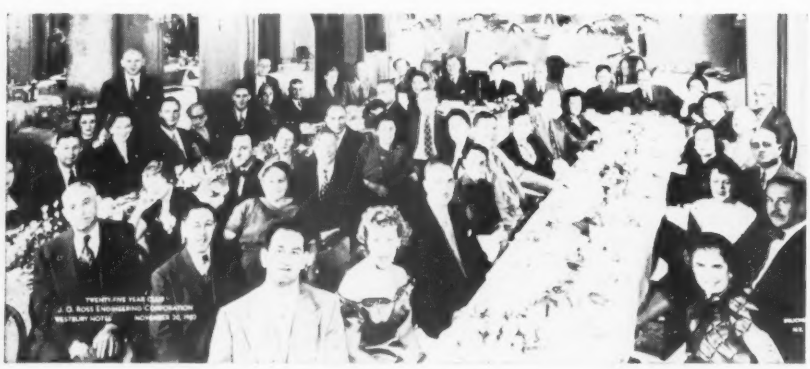
Must Educate Customers

Mr. Lowe stressed the importance of foundries making maximum use of society literature in telling the story of steel castings to the customer. He suggested that engineers of customers be taken to foundries so that they can see the problems of production as related to design. Meetings of customers' engineers to discuss casting design problems can be helpful. Foundry house organs offer an excellent medium to present information on castings design. In concluding his report, Mr. Lowe urged that foundrymen have a systematic program for educating customers on the design of steel castings.

Ross L. Gilmore, president, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., outlined briefly the results of a survey of member companies made by the Product Development Committee and its engineer during the past year. The study indicated that 30 per cent of the society membership is participating in some degree. Results from 39 foundries show an increase in business of $35 million through this work. Mr. Gilmore suggested that had all members participated the increase in sales might have reached $100 million. The complete report will be discussed at coming meetings of the various districts.

To get the most out of product development, Mr. Gilmore urged steel foundrymen to undertake the following program: 1—Use the wealth of material in the society research reports; 2—Get top management interested in product development; 3—Recognize the fact that in steel castings you have the best material

(*Concluded on page* 258)



TWENTY-FIVE YEAR CLUB DINNER: Employees of the J. O. Ross Engineering Corp. with 25 or more years of continuous service were present with their wives at the firm's annual 25-Year Club dinner, at the Westbury Hotel, New York. Six new members included J. M. Lainer, W. B. Mogor, R. G. McHose, J. D. Trepanier, J. J. Yurko and H. F. Voelker. Each was presented with an engraved wristwatch by S. W. Fletcher, corporation president. J. O. Ross, board chairman, welcomed new members

AJAXOMATIC POURING UNIT

In Operation at Montrose Division,

BENDIX AVIATION CORPORATION

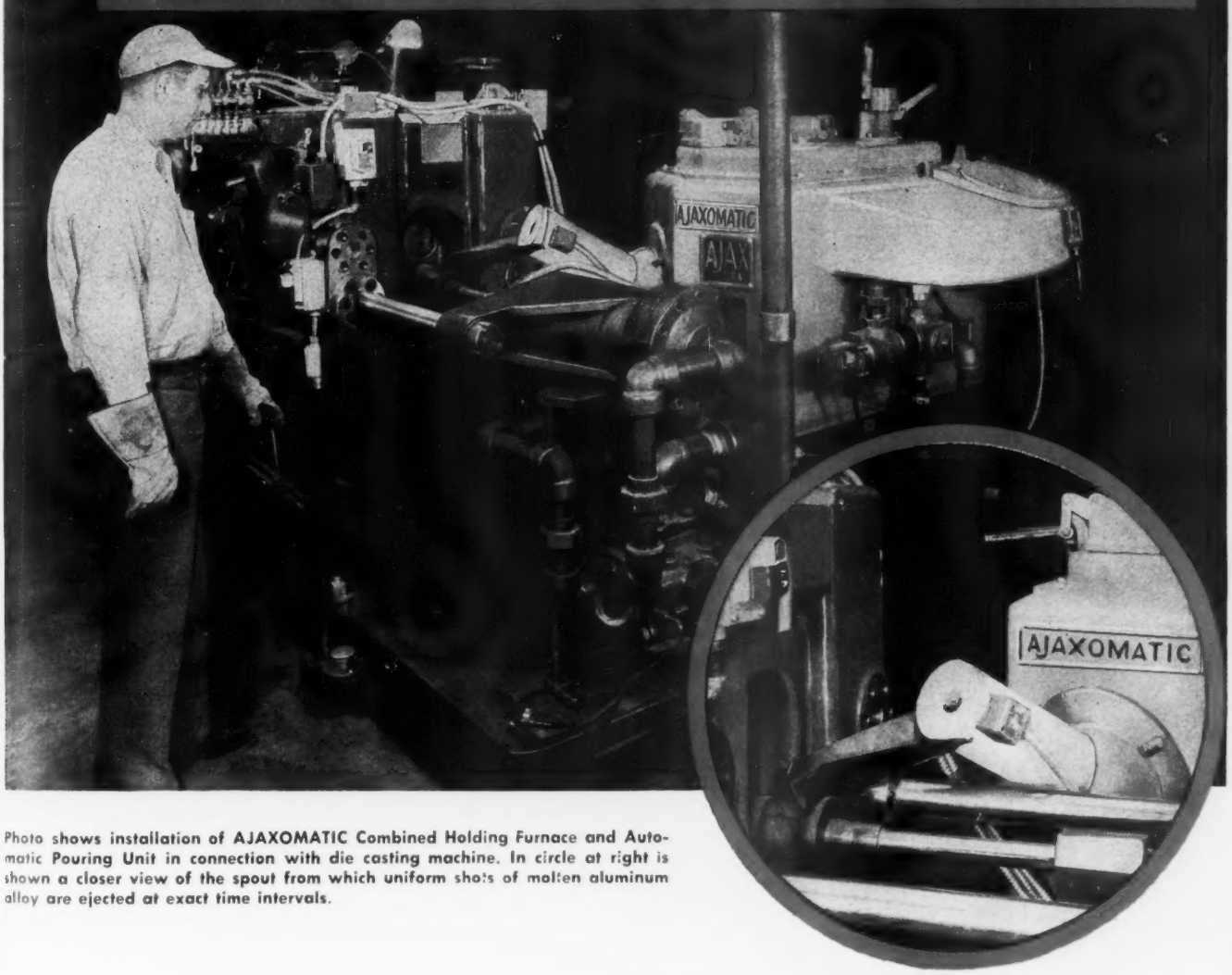


Photo shows installation of AJAXOMATIC Combined Holding Furnace and Automatic Pouring Unit in connection with die casting machine. In circle at right is shown a closer view of the spout from which uniform shots of molten aluminum alloy are ejected at exact time intervals.

NOW completely automatic die casting of aluminum alloys is possible in smaller quantities than formerly, and at reduced cost. This fact should be of special interest to the manufacturer who has die casting machines in operation and is doing hand ladling. The unit is entirely sealed, the operator feels no heat, accident hazard is eliminated.

This small, compact AJAXOMATIC* unit will increase production of die castings by as much as 25%, because it delivers regular, uniform quantities of metal into the die casting machine with no delay, immediately after dies are closed. The spout itself is heated and the temperature of each metal shot remains constant.

*Patents Pending

For further information send for descriptive folder A-5

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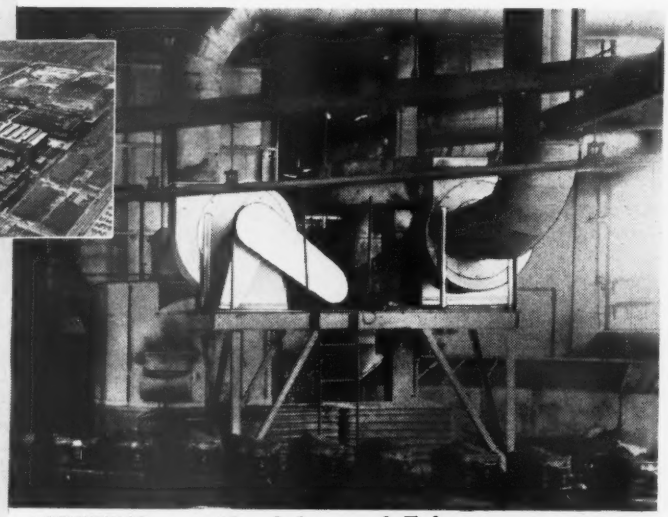
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., the Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

LUNGS *for Foundries*

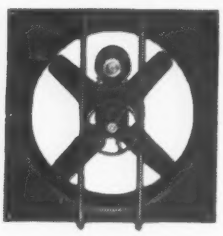


Birds-eye-view of the Budd Company, Detroit, Mich., in which General Blower has steel-plate Exhausters installed in conjunction with Simpson mix-mullers.

(Installation by National Engineering Corporation)

***GENERAL centrifugal fans and Exhausters are recognized by engineers and contractors for meeting exacting requirements for every kind of air movement. The photograph above shows an actual installation of GENERAL Steel - Plate EXHAUSTERS in conjunction with Simpson Mix Mullers for the operation of the cooling hood. The blower forces cool air into cooling hood and circulates it through-out the sand. The GENERAL steel-plate EXHAUSTERS remove the hot air, gas, moisture and fines. *General steel plate Exhausters are ruggedly constructed with heavy gauge steel and comes equipped with heavy-duty bearings. Why not call in our experienced engineers to survey your requirements—we have one in your vicinity.**

GENERAL Turbo Blowers (Type S & M) deliver Air or Gas against pressure or create suction over a range of 4 to 20 ounces; Type M for up to 32 ounces duty. Ideal for operation with crucible melting furnaces, core ovens and cupolas. Also applicable for all types industrial oil or gas burners. *Write for BULLETIN CB107 for Illus. and descriptions of types S and M General Turbo blowers.*



GENERAL belt-drive propeller EXHAUST fans are large enough to remove the increased volumes of contaminated air for complete ventilation of your foundry. The use of higher speed motors with V-belt drive results in an economical flexible unit. CENTRIFUGAL type fans for removal of hazardous industrial fumes or for conventional ventilating needs are also available. *Write for BULLETIN EF105 which covers capacities and dimensions of both belt-driven and directly connected exhaust fans or bulletin SF101 for propeller type fans.*

Man'frs. GB of FANS, BLOWERS, EXHAUSTERS

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(*Concluded from page* 256)

available today; 4—Study your organization and pick men for jobs where they can do their best work; 5—Be sure you are using the tools of quality control; 6—Take a serious look at the quality of your product; 7—See that the inspection department is responsible only to top management; 8—Start to think about future business when demand for castings may not be as heavy; 9—Set up a separate Product Development Department in your organization. To get results in product development, everyone from top management down must work at it.

Speaking on "Management Looks at Safety," A. M. Baltzer, staff director, Small Business and Association Program, National Safety Council, Chicago, stressed that safety is just good business. He said that smaller companies having no safety program have contributed more than their share of accidents. Between 70 and 80 per cent of occupational accidents take place in plants of small companies or those which have total employment of less than 500 persons.

Is Management Responsibility

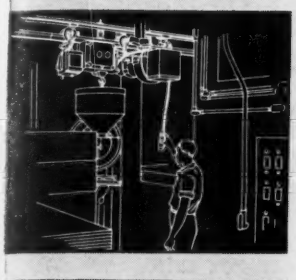
Safety, according to Mr. Baltzer, is a management responsibility. Too often management has no idea of the cost of accidents to the company. Management should have one on the staff who is charged with keeping in touch with the safety situation. The speaker stated that external pressures, including legislation, now are at work which will push many into active participation in safety work in the future.

In conclusion, Mr. Baltzer outlined the following steps in organizing a safety program: 1 — Management must have the will to stop accidents; 2—Someone must be assigned to do the job; 3—Locate hazards; 4—Make the job safe; 5—Make the worker safe; 6—Keep simple records; 7—Follow up using various devices, such as safety committees, films, posters, etc. In other words, keep forever at it.

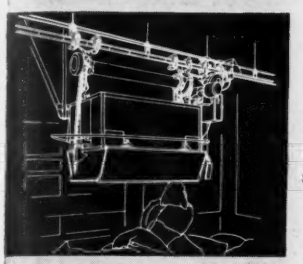
During the meeting, announcement was made of steel foundries with outstanding safety records for 1952. The list is as follows:

Hughes Tool Co., Houston, Tex., with a frequency rating of 0—this organization has not had an accident the last four years; United States Steel Co., Johnstown, Pa., frequency rating of 0; Mackintosh-Hemphill Co., Midland, Pa., 1.6; General Steel Castings Corp., Eddystone, Pa., 3.7; General Steel Castings Corp., Granite City, Ill., 3.8; Chapman Valve Mfg. Co., Indian Orchard, Mass., 7.9.

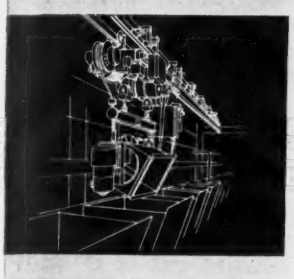
Sumner Iron Works, Everett, Wash., 7.9; Crucible Steel Casting Co., Cleveland, 8.6; Symington-Gould Corp., Depew, N. Y., 8.9; American Steel Foundries, Granite City, Ill., 8.9; Massillon Steel Casting Co., Massillon, O., 9.3. Grede Foundries, South Water Division, Milwaukee, started reporting its lost-time accidents in July, 1952. For the period July through December, their frequency rate was 0.



Dispatch to multiple stations



Delivery to fixed stations



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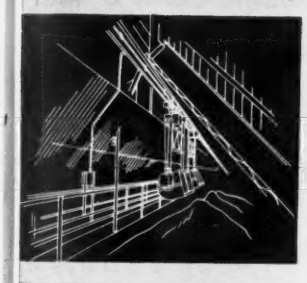
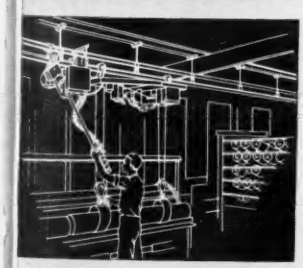
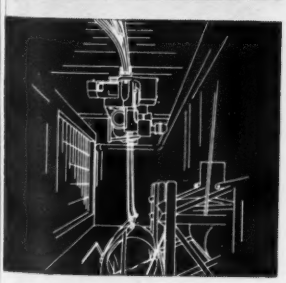


Delivery to movable stations

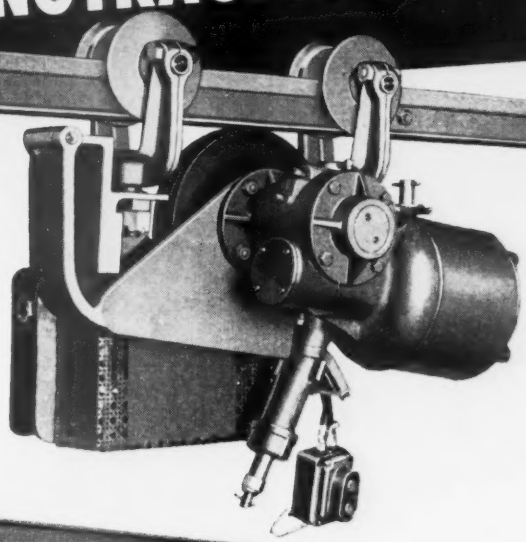


Selective dispatch between multiple stations

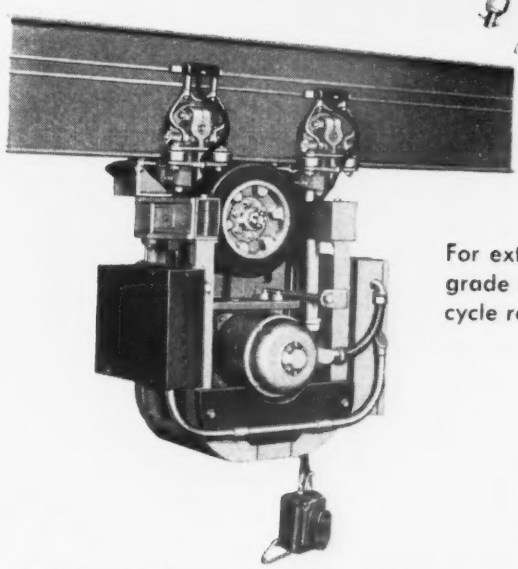


Load and delivery to multiple stations

2 New AMERICAN MONORAIL MONOTRACTORS



For low cost propulsion of a 1-ton hoist or carrier.



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To propel heavy loads or automatic carriers on overhead monorail systems, here are two new American MonoRail MonoTractors. Through the application of simple electrical and mechanical devices, American MonoTractor Units perform a wide variety of automatic handling operations.

While unique in many features, such systems are built mainly from standard units. MonoTractors can be applied to carriers operating on any smooth bottom track. An American MonoRail Engineer is available for consultation in every important industrial area.

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Activities of Foundry Groups

Cleveland Non-Ferrous

CONCLUDING meeting of the year for the Cleveland Chapter of the Non-Ferrous Founders' Society was held at the Cleveland Athletic Club, Mar. 5. The following were elected officers of the chapter for the coming year: Chairman, B. E. Weimer, Wellman Bronze & Aluminum Co., Cleveland; vice chairman, Frank Weiss, Weiss Brass Foundry & Mfg. Co., Cleveland; treasurer, D. T. Kennedy, Gluntz Brass & Aluminum Foundry Co., Cleveland; and secretary, W. O. Larson Jr., Grafton Foundry Co., Grafton, O.

William Gluntz, Gluntz Brass & Aluminum Foundry Co. and treasurer of the national society, reviewed the history of the society and pointed to the progress made over the past years through the co-operation of those in the industry. He then led a discussion on the "Terms and Conditions of Sale" recently developed by the Non-Ferrous Founders' Society. They were accepted as read.

In conclusion, R. F. Dalton, development engineer for United States Gypsum Co., Chicago, showed a movie on the uses of hydroperm plaster in the nonferrous foundry industry.—*W. O. Larson Jr., Grafton Foundry Co.*

Detroit

PRIZES to winners of the chapter's apprenticeship contest were awarded during the Mar. 19 meeting of Detroit Chapter of the AFS held at the Detroit-Leland Hotel. Paul Copeland, Ford Motor Co., and chairman of the pattern contest committee, offered an encouraging message to the 35 contestants present.

Winners of the wood patternmaking contest were: Val E. Kimmel, City Pattern Foundry & Machine Co., first prize; Cass Lacki, Ford Motor Co., second prize, and Leonard T. Hodorek, Cadillac Motor Co., third prize. Winners in the metal patternmaking contest were: Walter Lewendowski, Ford Motor Co., first prize; George M. Smith, Automotive Pattern, second prize; Richard Laundra, Annex Pattern, third prize.

Harry E. Gravlin Jr., Ford Motor Co., introduced the meeting's principal speaker, Dr. Richard Schneidewind of the University of Michigan, Ann Arbor, Mich. His paper on "Composition and Properties of Gray Iron" dealt first with the theoretical aspects of carbon and silicon in their relation to eutectic carbon. Base composition, impurities, rate of cooling, melting practice and alloys, all exert their influence. The speaker stated that the largest amount of graphitic carbon is produced when per cent of C + ⅓ (Si + P) = 4.3 per cent. He said that two different irons with the same carbon equivalent have the same fluidity.

In predicting the tensile strength of iron, Dr. Schneidewind suggested the formula that can be applied to an iron made with reasonable practice. For a 0.875-in. bar, 11.78-2 x C.E. = T.S. x 1000. For a 1.2-in. bar, the factor would be 11.5; and 11.0 for a 2.0-in. bar. He also said that superheat up to 2930° F would increase strength and that late silicon additions would do the same.

In speaking of alloying, Dr. Schneidewind covered the effects of chromium, vanadium, molybdenum and managanese in increasing strength. For a machinable, wear-resistant 45,000 psi iron, the carbon-equivalent should be 3.7 for light sections and 4.0 for heavy sections.—*Walter P. Kantzler, Kelsey-Hayes Wheel Co.*

CHICAGO Chapter of the AFS met Mar. 2 to hear Earl L. Shaner, editor-in-chief of *Steel*, Cleveland, speak about "Challenges to Business in 1953—Competitive and Otherwise." Left to right in bottom view are Mr. Shaner; Frank G. Steinebach, Editor of *FOUNDRY*; Robert Hammond, Whiting Corp.; John A. Rassenfoss, American Steel Foundries, chapter vice president; R. L. Doelman, Miller & Co., chapter secretary; J. W. Thomson, Continental Foundry; John H. Owen, Harbison-Walker Refractories Co., chapter president; C. V. Nass, Beardsley & Piper Division, Pettibone Mulliken Corp.; and Fred B. Skeates, Link-Belt Co., general chairman of the committee acting as host to the AFS convention in Chicago, May 4-8. Upper view shows a group from Pettibone Mulliken Corp. at the meeting. Photos by I. H. Dennen, Beardsley & Piper

New England

REGULAR monthly meeting of the New England Foundrymen's Association was held Mar. 11 at the University Club in Boston, with 140 members and guests present. President Joseph B. Stazinski, General Electric Co., appointed Henry Frechette as chairman and Fred Halloway, Henry Stenberg, Harry Impey, Alec Beck and Clyde Armstrong to serve as a committee in arranging the organization's Fun Night which is to be

(*Continued on page* 263)

Desulphurization with SOLVAY DENSE SODA ASH

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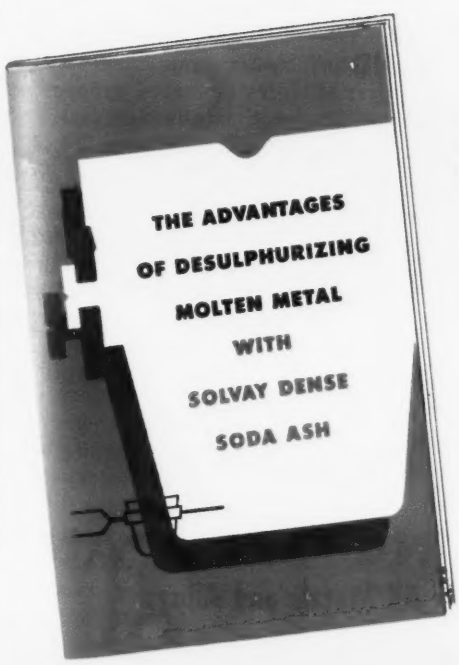
SOLVAY DENSE SODA ASH is especially effective for desulphurization. This 100% active material helps produce better, more fluid metal . . . and gives you these other advantages: it's free-flowing; the small grains melt very rapidly, allowing faster, more uniform dispersion; and it's easily added by means of simple equipment. The use of Solvay Dense Soda Ash is a flexible one—you use only as much as you need. And remember, Solvay Dense Soda Ash is the *low cost* form of desulphurization!



Further Information Contained in Valuable Book—Available on Request

"The Advantages of Desulphurizing Molten Metal with Solvay Dense Soda Ash" has been published by Solvay for the benefit of the foundryman. It contains important information on the advantages you can gain by desulphurizing with Solvay Dense Soda Ash. It also explains what type of equipment is needed and how to obtain it. This book is available free—on request—by simply writing to Dept. F-5. Be sure to get your copy.

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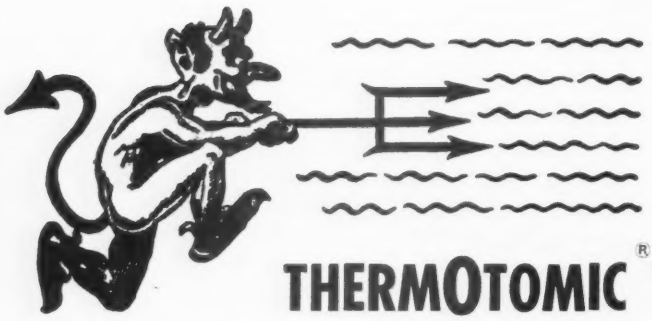
Sodium Nitrite · Para-dichlorobenzene · Ortho-dichlorobenzene · Monochlorobenzene
Ammonium Chloride · Sesquicarbonate of Soda

Produce More Castings Per Heat
with



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THERMOTOMIC® "HOTOP" LIQUIDIZER

Exothermic Carbon Free Liquidizer For Iron, Steel, Nodular Iron

This new head compound saves feeding metal in risers or feeding heads which can now be reduced in height 40 to 70%

SOFFEL'S THERMOTOMIC HOTOP CARBON FREE LIQUIDIZER is different from other head compounds in that HOTOP LIQUIDIZER does NOT contain powdered metal, is NOT a thermit compound. It is a patented exothermic compound entirely free of carbon, sulfur and phosphorous and can be used without danger of contamination an any ferrous metal or alloy.

HOTOP LIQUIDIZER also saves molding time as less sand is needed in the mold cope due to short height of risers. HOTOP LIQUIDIZER produces a liquid slag well over 4000° F. of heat and insulates the metal. The feeding metal will remain liquid at least 50% longer assuring adequate feeding while the casting cools and solidifies. Piping and shrink cavities caused by premature freezing of the feeding metal are eliminated.

GUARANTEED TO PRODUCE SOLID CLEAN CASTINGS

SOFFEL'S FAMOUS CARBON FREE LIQUIDIZER FOR ALL METALS and ALLOYS

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is the leader in major foundries for use on both ferrous and non-ferrous metals and also in ingot production. It is the original scientific non-carbon, exothermic compound for feeding heads and risers.

When applied on the heads or risers CARBON FREE LIQUIDIZER reacts within itself exothermically, producing a temperature above 3200° F. It actually increases the temperature of the feeding metal to a point well above that of the metal in the main body of the casting, thus ensuring that the feeding metal will be the last to freeze. In this manner, shrink cavities in the casting caused by premature freezing of the feeding heads will be eliminated. After the exothermic action has ceased, the LIQUIDIZER forms a soft refractory insulating blanket on the metal. This confines the heat generated by the LIQUIDIZER and aids in maintaining the desired high temperature of the feeding metal in the heads or risers.

SOFFEL'S THERMOTOMIC COMPOUND
PATENTED
FOR ALL METALS and ALLOYS

THERMOTOMIC COMPOUND is a patented Exothermic compound that can be molded into any desired shapes and used as feeding ring inserts under risers or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with 1½" feeder openings. This permits easy removal of the casting feeding heads and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing mixed with molding sand in the mold, heat at thin metal sections is retained until the thick main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength. For use in green sand molds, use THERMOTOMIC W. P. (Waterproofed)

NOTE: SOFFEL'S CARBON FREE LIQUIDIZER NO. 5 is recommended for use on top of feeding heads in conjunction with THERMOTOMIC COMPOUND. For aluminum castings, use THERMOTOMIC ABC and AL-X31 LIQUIDIZER. When ordering a trial sample, advise the kind of metal to be used on.

U. S. Patents No. 2,490,327 and No. 2,500,097

PITTSBURGH METALS PURIFYING COMPANY

World's Largest Manufacturers of Fluxes and Purifiers For All Metals and Alloys

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(*Continued from page* 260)

staged in June.

Following the business meeting Larry R. Spaulding, general manager of Spaulding Metal Works Inc., Nashua, N. H., was introduced. Mr. Spaulding presented a series of colored slides which illustrated operations in his small jobbing foundry as well as other foundries and machine shops in the Nashua area.—*Myron DeHollander, General Electric Co.*

Ontario

FIRST meeting in the history of Ontario Chapter of the AFS to be held in Brantford, Ont., attracted more than 200 members, a record attendance. Meeting was held Jan. 30 and featured the award of three 50-year service pins. Recipients were Robert Holland, Dominion Wheel & Foundries Ltd., Cobourg, Ont., for 57 years service; H. Boulton, Waterous Ltd., Brantford, and B. Hendershott, Massey-Harris Co. Ltd., Brantford, who each have 52 years service.

During the afternoon, about 100 took advantage of the invitation to tour Cockshutt Farm Equipment Ltd. and "M" Foundry of Massey-Harris Co. Ltd., two of the most modern production foundries in Canada.

"Nondestructive Testing as a Foundry Tool," was the subject of an address by John Anspach, service engineer, Meehanite Metal Corp., New Rochelle, N. Y., before the ferrous group meeting. R. A. Klingberg, Hartley Foundry Division, London Concrete Machinery Co., Brantford, served as technical chairman. Mr. Anspach urged use of some form of nondestructive testing as a means toward producing sound castings. Internal defects, revealed after expensive machining, reflect badly on the foundry industry, with the result that weldments and forgings have replaced many formerly cast machine parts.

To build and hold a large volume of casting business, the speaker said, it has become necessary to guarantee consistent quality production castings. The speaker described, with the aid of slides, the four major means of non-destructive testing: Radiography, ultrasonic, Magnaflux and penetrant methods. He urged foundrymen to investigate cobalt 60, a radioisotope now available to industry.

The nonferrous session featured a panel discussion on patterns. Panel members were John McRoberts, Hamilton Match Plate Co., Hamil-

(*Continued on page* 266)

High scrap loss and clean-up cost
(cast in green sand)
Clean-up down, No scrap loss
(cast in shell molds)
Shell molding success with MAGNESIUM... and DUREZ Resins!
Photos courtesy Utica Radiator Corporation

Magnesium is now being added to the list of metals that can be cast profitably in shell molds. Mixtures of Durez phenolic resin and sand, with suitable inhibitors to prevent burning, produce shells in which magnesium castings are molded successfully.

Better Castings at less cost resulted when shell molding replaced the green sand method in this example. Misruns which previously had caused high scrap loss were eliminated. Rough surfaces and parting-line fin that made clean-up costly were replaced by surfaces so smooth that no finishing was necessary after shakeout. No backing and no risers are needed in this job. The Durez bonded shell molds vent gases rapidly, help to assure the desired structural qualities and dimensional accuracy of the castings.

Let Durez help you profit by the numerous economies of shell molding in adapting it to jobs for which it is the best method. Your inquiry will receive the prompt attention of an organization that has specialized in phenolics for 32 years.

Specialists for 32 years in developing phenolic resins and plastics to meet the needs of industry.

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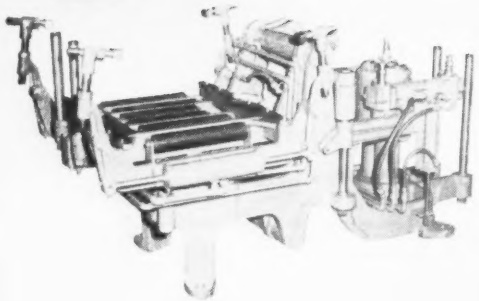
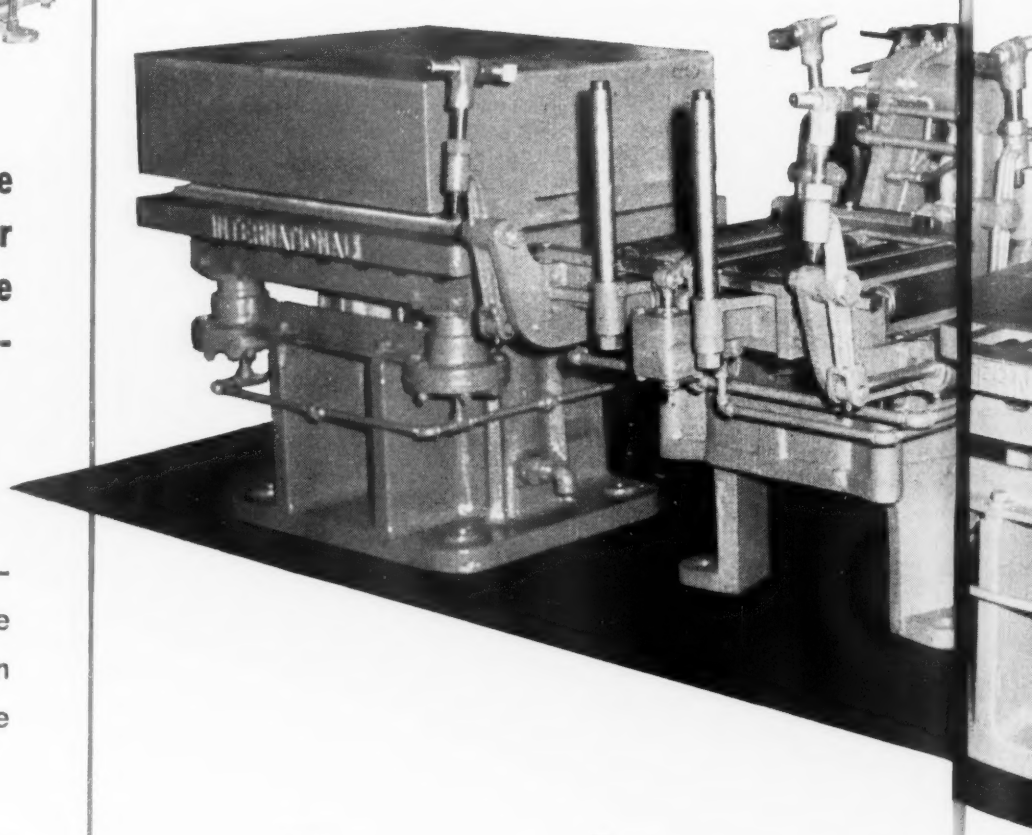


Combining Internationals G



The International Type GJR Air Rollover, Air Draw Molding Machine offers you these outstanding features -

- Accuracy of draw
- Air-Actuated Clamps — for clamping either the core box or the pattern plate to the machine frame
- Air Clamps—to clamp core plates or bottom boards
- Air-Operated Equalizers
- Air Vibrators

Foundrymen

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TYPE JJR

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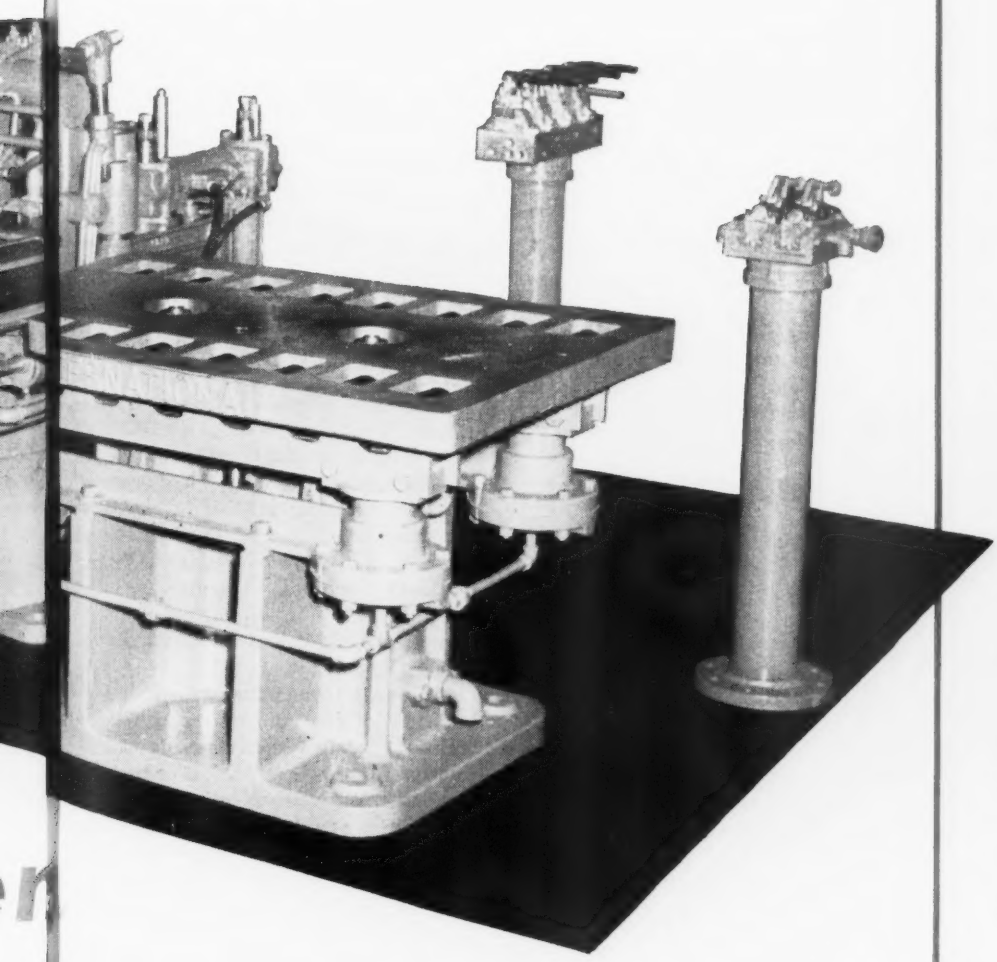

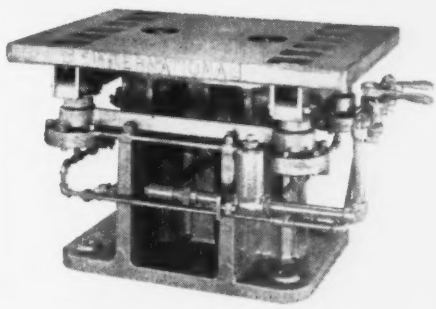

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The International Line is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

(*Continued from page 263*)

ton; Ted Robinson, John Bertram & Sons Co. Ltd., Dundas; Les Bland, Neptune Meters Ltd., Toronto; Fred Bowery, Massey-Harris Co. Ltd., Brantford; George Bott, Welland Electric Steel Foundry, Welland; with Tom Myatt, Toronto Pattern Works, Toronto, serving as discussion leader. A lively discussion developed on linear shrinkage, some panel members believing that methods of molding, types of gates and position of risers influence the amount of shrinkage from pattern to casting stage.

Mr. Bott read a short paper describing desirable features which should be incorporated in a good pattern. Then Mr. Bowery outlined his company's procedure before a matchplate production pattern is made. Five department supervisors—pattern, engineer, metallurgy, foundry and cost—are involved in deliberations to insure the pattern will produce castings successfully and economically.

Mr. McRoberts pointed out that in matchplate patterns the necessary space between pattern and flask often receives secondary consideration in an effort to get as many patterns on a plate as possible. Ample room should be provided around the projection of an upset plate to clear sand strips. Neglect of those features is a common cause of runouts and crushes. — *Fred J. Rutherford, Refractories Engineering & Supplies Ltd.*

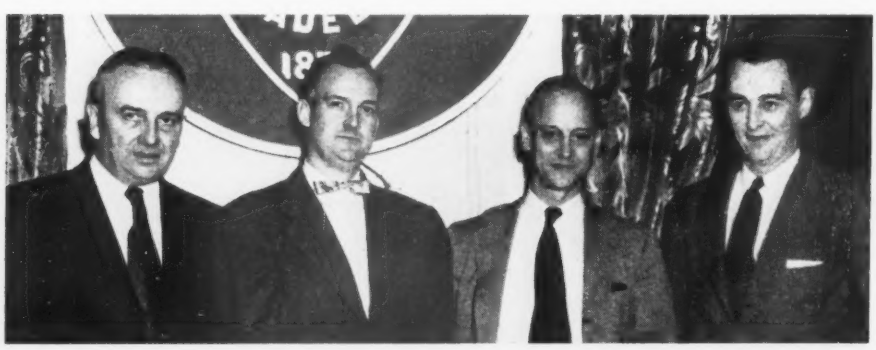
Philadelphia

MORE than 150 members and guests of Philadelphia Chapter of the AFS heard Thomas J. Wood, chief metallurgist of Brake Shoe & Casting Division, American Brake Shoe Co., Mahwah, N. J., discuss "Acid vs Basic Lining for the Cupola," at the Mar. 13 meeting. John P. Laux Jr., foundry superintendent, Pusey & Jones Corp., Wilmington, Del., served as technical chairman.

Mr. Wood said it was inevitable that in the transition of the foundry industry from an art to a science that the cupola would receive attention. Probably the major technical development in cupola operation in recent years has been the investigation and use of basic refractories and slags. Materials, physical properties of iron produced and comparative costs were included in the discussion.

The speaker believes that, despite unfavorable cost of basic operation, the possibility of producing low-phosphorus and low-sulphur irons without resorting to higher percentages of pig iron is attractive to most foundry operators and is of keen interest to those foundries producing flake and nodular graphite irons. To offset higher refractory and silicon costs there are two possibilities: Water cooling at the melting zone of the cupola and development of graphite block lining for the melting zone area. —*D. E. Best, Bethlehem Steel Co.*

PHILADELPHIA Chapter of the AFS heard W. S. Pellini, Naval Research Laboratory, Washington, discuss "Feeding Range of Risers" at its February meeting. Shown at the meeting, left to right, are E. H. Berry, Dodge Steel Co., technical chairman for the meeting; E. A. Zeeb, Dodge Steel Co., chapter director; Mr. Pellini, and D. E. Best, Bethlehem Steel Co., chapter director Below, at the Mar. 13 meeting, left to right are Charles O. Butler, Palmyra Foundry Co., chapter director; Charles W. Mooney, Olney Foundry Division, Link-Belt Co., chapter director; Thomas J. Wood, American Brake Shoe Co., guest speaker, and John P. Laux Jr., Pusey & Jones Corp., technical chairman for the meeting. Photos by Leo Houser, Dodge Steel Co., Philadelphia



Metropolitan

VARIOUS methods of reclaiming ferrous and nonferrous castings were discussed at the Mar. 2 meeting of Metropolitan Chapter of the AFS. The meeting was held at the Essex House, Newark, N. J., and the following were speakers: Wilson N. Pratt, director of development, American Metalseal Corp., West New York, N. J., who spoke on impregnation; Art Kugler, mechanical engineer, Technical Sales, Air Reduction Co., New York, who discussed welding; and Howard Vanderpool, sales engineering manager, Metallizing Engineering Co., Long Island City, N. Y., who covered metallizing methods. Technical chairman was Dr. Norman E. Woldman, consulting metallurgical engineer and editor of *Alloy Digest*.

Mr. Pratt traced the history of reclamation of castings by impregnation from the early use of sodium silicate to present-day practice of using resins. Such drawbacks as need for refrigeration and lack of a copper-stabilized material have been overcome. Steps in impregnation include cleaning the casting, evacuating the pores, putting in the polyester (styrene), applying pressure, curing and final cleaning.

In his discussion of welding, Mr. Kugler outlined eight basic methods, including arc, gas, resistance, thermit, braze, forge, induction and flow welding. He showed that many combinations and variations of these methods plus the use of different types of atmosphere or shielding make it possible to find a satisfactory welding method for almost any problem. In many cases, however, limitations of available facilities or production requirements make compromises necessary. Mr. Kugler pointed out particularly the need for pre-heat and post-heat in welding cast iron.

The concluding speaker, Mr. Van-

(*Continued on page 268*)

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	Vanadium	Silicon max.	Carbon max.
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Special Grade	50 to 55%	2%	0.50%
Open-Hearth Grade	50 to 55%	8%	3%
Foundry Grade	50 to 55%	approx. 10%	3%

Vanadium Oxide (3 Grades)	Composition		
	Vanadium Oxide (V_2O_5)	Sodium Oxide (Na_2O)	Calcium Oxide (CaO)
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Sodium Polyvanadate (Red Cake)	approx. 85%	approx. 9%	approx. 2%
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(*Continued from page* 266)

derpool, emphasized in his discussion that proper surface preparation and selection of proper spray wire are the major factors involved in obtaining desired results in casting salvage by metal spraying. He indicated that the bond obtained is mechanical in nature and is not intended to improve physical strengths of castings in the manner that weld repairs can be used. By proper selection of wire, good color match can be obtained without detrimental effects during subsequent surface finishing operations.—*Andrew Devlin, Daniel Goff Co., and Robert J. Ely, American Brake Shoe Co.*

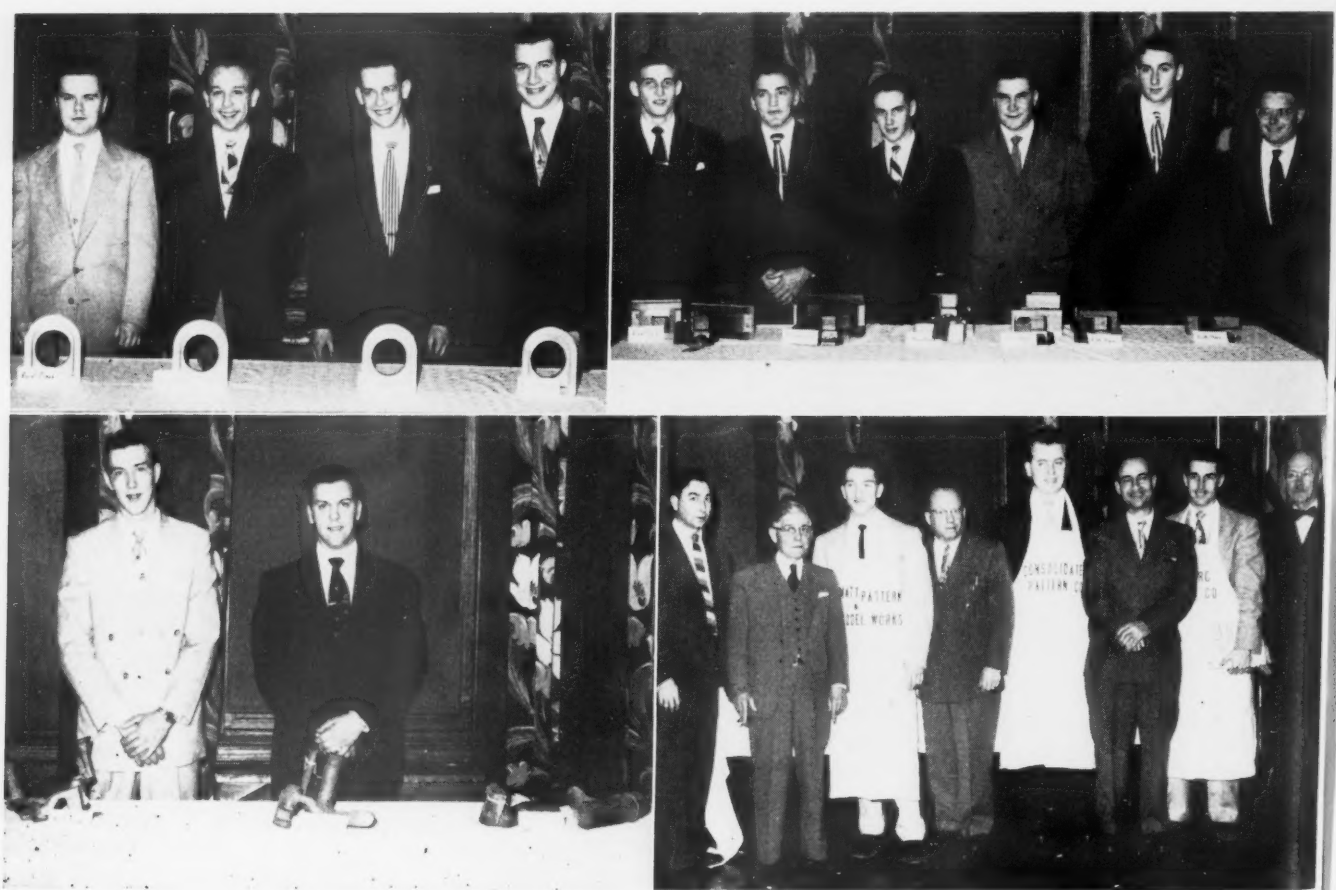
St. Louis

MORE than 150 members and guests who attended the Mar. 12 meeting of St. Louis District Chapter of the AFS saw eloquent evidence that the foundry industry of the St. Louis area is doing something concrete to provide itself with skilled journeymen for now and the future.

As a climax to a hotly contested apprenticeship competition, E. R. Belton, Progressive Pattern Co., and chairman of the chapter's Apprentice Training Committee, presented the winning contestants and their respective entries in wood patterns, metal patterns and molding. The work performed by the young men was of excellent quality and created much interest and comment among the ex-

(*Continued on page* 270)

ST. LOUIS Chapter of the AFS heard William Ball, left, R. Lavin & Sons Co., Chicago, discuss "Human Engineering" on Mar. 12. Below, left view, top row, are Elwood Hey, Progressive Pattern Co.; Russell Elze, Central Pattern Co.; Ernest Kraemer, Quality Pattern Co., and Robert Mahoney, Consolidated Pattern & Mfg. Co., first through fourth prize winners, respectively, in the metal division of the chapter's patternmaking apprenticeship contest. Right view, left to right, shows William Zimmer Jr., Arnett Pattern Co.; Merle Greiner, unattached; Rudolph Schmid, Progressive Pattern Co.; Gilbert Engle, American Steel Foundries; Richard Dvorak, Consolidated Pattern Co., and Michael Geiser of American Car & Foundry Co., first through sixth place winners respectively in the wood division. Bottom row, left view, left to right, are Paul Sexton, Semi-Steel Casting Co., and Elmer Hemmer, Excelsior Foundry Co., first and second prize winners in the molding apprenticeship contest. Third prize winner William F. Stevens, Banner Iron Works, was not present. Right view, left to right, shows C. E. Rutledge, Bureau of Apprenticeship, U. S. Dept. of Labor; F. W. Burgdorfer, chairman, St. Louis Patternmakers Joint Apprenticeship Committee; Journeyman Patternmaker Alfred M. Sandweg, Matt Pattern Co.; R. W. Schroeder, chairman, National Apprenticeship Contest Committee, AFS; Journeyman Patternmaker R. C. Kastrup, Consolidated Pattern Co.; E. R. Belton, chapter apprentice training chairman; Journeyman Patternmaker R. C. Barchek, Nordberg Mfg. Co., and Director M. R. Bass, David Rankin School of Mechanical Trades



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CENTRAL ILLINOIS Chapter of the AFS was addressed Mar. 2 by R. P. Schauss, sales manager, Werner G. Smith Inc., Chicago. Left to right, L. J. Voros, general foreman, Caterpillar Tractor Co., Peoria, Ill.; Mr. Schauss, and R. Beebe, foundry superintendent, International Harvester Co., Canton, Ill., are discussing core problems prior to Mr. Schauss's talk on core practice

(*Continued from page* 268)
perienced "old-timers."

F. W. Burgdorfer, chairman of the St. Louis Patternmakers Joint Apprenticeship Committee, presented certificates of completion of the five-year apprentice course to Alfred M. Sandweg, Matt Pattern Co.; Raymond C. Kastrup, Consolidated Pattern & Mfg. Co.; and Robert R. Barcheck, Nordberg Mfg. Co. Mr. Burgdorfer pointed out that the Apprentice Training committee is one of the oldest functioning committees within the AFS, the first discussions on record having taken place in Philadelphia in 1896.

Benefits of apprentice training to both trainees and employers were discussed further by M. Reed Bass, director of the David Rankin School of Mechanical Trades, St. Louis, C. E. Rutledge of the Bureau of Apprenticeship of the U. S. Department of Labor, and Prof. R. W. Schroeder, University of Illinois, Navy Pier Branch, Chicago, who is chairman of the AFS Apprentice Contest Committee. In conclusion recognition for his work in training young men for the foundry industry was given Eugene Ziaja, instructor at the David Rankin School.

Principal speaker for the meeting was William Ball, R. Lavin & Sons Inc., Chicago, who gave an inspiring talk on "Human Engineering."—*Fred J. Boeneker, Bronze Alloys Co.*

Central Illinois

CORE Practice as Related to Foundry Losses" was reviewed by Robert P. Schauss, sales manager for Werner G. Smith Inc., Chicago, at the Mar. 2 meeting of Central Illinois Chapter of the AFS. Meeting was held at the American Legion Hall, Peoria, Ill., with Louis J. Voros, general foreman, Caterpillar Tractor Co. as technical chairman.

Mr. Schauss pointed to the fact that excess foundry scrap many times can be charged to improper cores. Expounding on some of the causes of improper cores and their effects on castings, he listed principal defects as sagging, underbaking, overbaking, soft cores, hard cores, poor coremaking and venting.

Chairman George Rockwell, Caterpillar Tractor Co., appointed Robert Dickison, Brass Foundry, Peoria; Ralph Beebe, International Harvester Co., Canton, Ill.; and George Schuller, Caterpillar Tractor Co., to serve as a nominating committee. He also commended the work of the AFS student chapter at the University of Illinois and invited the members to visit their chapter.—*L. E. Kinsinger, Caterpillar Tractor Co.*

Connecticut Non-Ferrous

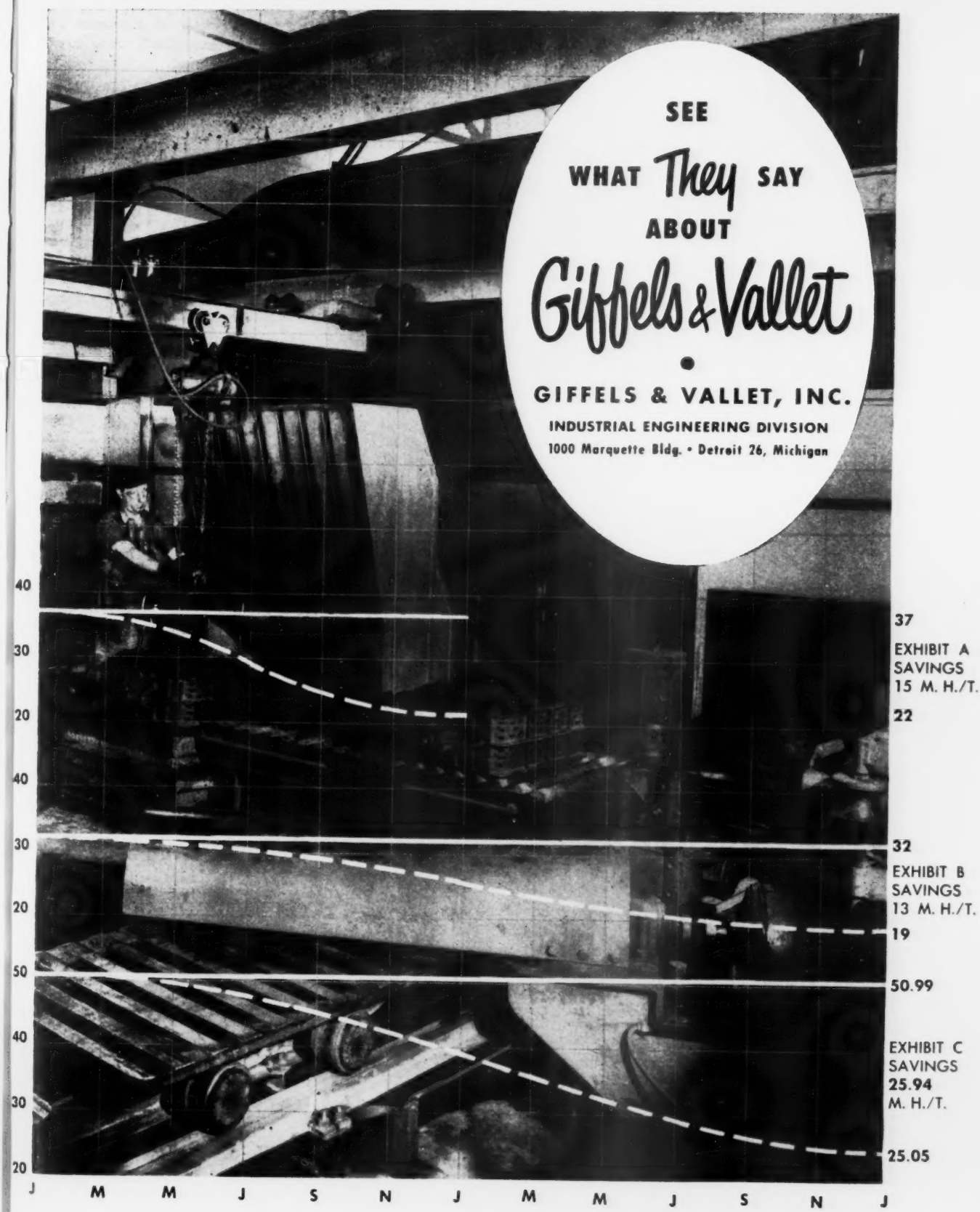
AT THE Jan. 21 meeting of Connecticut Non-Ferrous Foundrymen's Association Adam Kafka, development engineer, Beardsley & Piper Division, Pettibone Mulliken Corp., spoke on "Practical Aspects of Core Blowing in Jobbing Foundries."

To obtain properly blown cores consistently, a properly operating core blower, correctly rigged metal corebox equipment and consistent and properly mulled sand are required, the speaker said. To determine core blower capacity for a given job three factors are considered. The area of the corebox must not exceed the vertical clamping area of the core blower; the sand magazine should hold at least twice as much sand as needed for the core and have an open area close to the size of the box being blown; and the supply of air must be sufficient.

The most important feature in designing good coreboxes is the placing of blowholes and vents. Small blowholes and more of them usually make

(*Continued on page* 272)

UNIVERSITY OF WISCONSIN Student Chapter of the AFS was installed Jan. 15 with S. C. Massari, technical director, AFS, handing the cast iron rattle to Student Chairman J. H. Dance. The installation was preceded by an afternoon joint meeting of the university advisory and Foundry Educational Foundation industrial advisory committees. Shown above at the installation, front row, left to right are: R. Gregory; C. Loper, chapter vice chairman; J. Hren; J. Dance; S. C. Massari; J. Water; R. Schluter; J. Leer; H. Shannon; G. Reinemann, and R. W. Heine, faculty adviser. Back row: W. Miller; P. Benson; M. Graham; C. Schoettler; B. Kramer; J. Davies, secretary-treasurer; G. Ullenberg; J. Selle and J. Mead



THREE ACTUAL EXAMPLES OF SAVINGS IN MAN HOURS PER TON IN A STEEL CASTINGS CLEANING ROOM AND IN AUTOMOTIVE GREY IRON CASTINGS

Names of these firms upon request

(*Continued on page 270*)

for better results than large and fewer ones. The small hole "sprays" the sand at greater velocity and packs it much better. Hard-to-get-at corners are better taken care of with well directed small holes than with large holes.

Properly mulled core sand is highly important although no radical change is needed from the sand preparation used for hand coremaking. The same mixes used with good results for hand ramming will usually suffice to blow good cores. The core sand mixes should always be well mixed; mulling is recommended whether the sand is to be used on benches or in blowers. In the more common core sand mixtures used for blowing, a moisture content of 1½ to 3 per cent is usual.

The blowhole bushing also is important. Many types are available commercially, some being rubber lined, some with adapter sleeves, some are steel or brass tubing, but all, when properly installed, provide an airtight seal between the blowplate and corebox or ventplate during the blowing cycle. After the core is blown and ready to be stripped or drawn, the bushing should break the sand cleanly and evenly at the core line, otherwise excess sand has to be slicked off by hand.

In conclusion, Mr. Kafka demonstrated the wrong and right ways to blow cores.—*John V. McCarthy, North American Smelting Co.*

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Michigan State

AN open meeting, at which members of other student engineering societies were invited as well as men engaged in the welding trade from the Lansing area, was arranged on Mar. 4 by the Michigan State Student Chapter of AFS. A demonstration of arc welding was presented by L. D. Richardson, welding consultant and sales manager, Eutectic Welding Alloys Corp.

Mr. Richardson welded brass, matching the color of stock and weld, and welded aluminum with ease. He built up gear teeth on plain bar stock, welded tool steel rod to a soft steel shank to form a tool bit and welded stainless steel to cast iron. He also demonstrated a grooving electrode developed by the Eutectic company which prepared cracks in castings for welding in one operation.

The chapter has arranged open meetings of this type since it is felt they promote greater understanding of foundry methods by men and students who at some time may be working in conjunction with the foundry industry even if they are not themselves associated with the industry.—*Bruce L. Harding*

Reading

PRINCIPAL speaker at the Feb. 17 meeting of Reading Foundrymen's Association was Adam Kafka, foundry engineer for Champion Foundry & Machine Division of Beardsley & Piper, Chicago. Meeting was held at the Berkshire Hotel, Reading, Pa., with 85 members and guests present.

James Woodward, Excelsior Brass Foundry, and vice president of the association presided, with John Franks, East Penn Foundry Co., as technical chairman.

Mr. Kafka's talk was entitled "Practical Aspects of Core Blowing in Jobbing Foundries," with which he presented colored slides to illustrate the core blowing operations he described.

The necessity of reducing costs in order to meet competition in the foundry market was emphasized by C. R. Robeck, vice president, Gibson & Kirk Co., Baltimore, Md., and Dr. C. R.

(*Continued on page 274*)

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STREET_____

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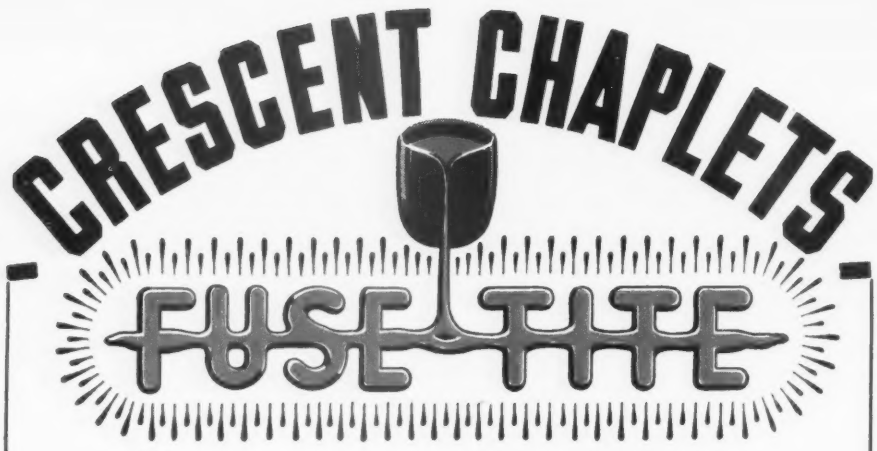

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- **DOUBLE HEAD CHAPLETS**
- **MOTOR CHAPLETS**
  (Regular or Extended stems)
- **TIN TUBES**
  (Plain or Perforated)
- **FOUNDRY NAILS**
  (Plain, Nicked or Barbed)
- **SKIM GATES**
- **CORE WIRES**
- **CORE PLATES and SHIMS**
- **TAPER DRIVE PLUGS**

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(Continued from page 272)

Austin, Meehanite Metal Corp., New Rochelle, N. Y., in addressing the 100 members and guests present at the Reading Foundrymen's Association Mar. 17 meeting.

Mr. Robeck stated that control of foundry costs is one of the large responsibilities of supervision. "Waste and loss which heretofore were more or less accepted must now be eliminated," he said. "Recent economic pressures emphasize the importance of controlling such things as loss of material through oxidation, spillage, skimmings and drosses, and heavy grinding losses in the removal of gates and risers in the cleaning department."

Dr. Austin discussed the Crofts process of introducing cast iron borings or chips into the cupola charge. This is a recently developed method which was described in the July, 1952 issue of FOUNDRY.

James S. Hinkley, Dick Bros. Inc., Reading, and president of the association, announced the appointment of H. P. Good, Bruce W. Edris and A. L. Wentzel as a nominating committee. Election of officers will be held at the association's May meeting.—*W. I. Cassidy*

Metropolitan Brass

THE Metropolitan Brass Founders Association, New York, announces a foundry practice course for beginners and for those wishing to obtain a practical knowledge of foundry work which is being offered by the New York City Board of Education at the Machine and Metal Evening Trade School. Classes are held from 7 to 9 p.m. two evenings weekly throughout the spring term.

Further information may be obtained from Frank M. Kinsler, teacher-in-charge at the school, 321 East 96th Street, New York. Instruction will be given in green sand molding coremaking, melting and pouring of metal.—*George Staub, Executive Secretary*

Quad City

AN OVERFLOW attendance of interested foundrymen were present at the Mar. 16 meeting of the Quad-City Chapter of the AFS held at the Fort Armstrong Hotel, Rock Island, Ill. Walter Sokolosky, foundry service engineer for Monsanto Chemical Co., Springfield, Mass. ,spoke on "Shell Molding."

The speaker pointed to the necessity of using good equipment and raw materials. He outlined some of the difficulties encountered in the process

(Continued on page 276)

A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

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The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

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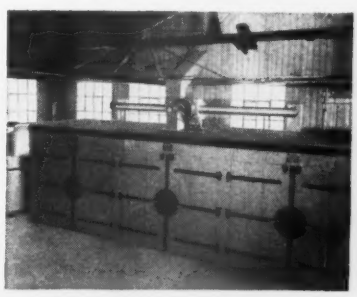
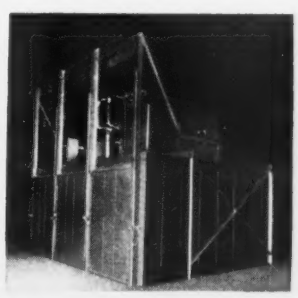
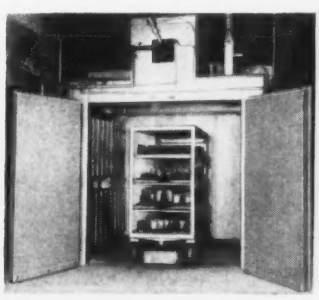


Three Compartment Rack Type Oven



3 Compartment Rack Type Oven

Continuous Core Blacking Oven



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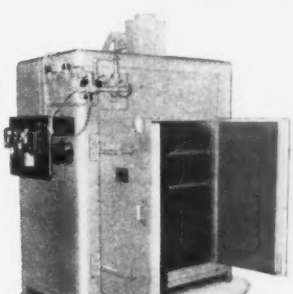


Shelf Type Core Oven

NORTHEASTERN OHIO Chapter of the AFS was host on Mar. 12 to the chapter's apprenticeship contest winners, at top left. Chapter President Frank Cech, Cleveland Trade School, stands beside John Bolibrush, wood pattern winner, who is shaking hands with AFS President I. R. Wagner, Electric Steel Casting Co., Indianapolis. At right is Jim Goldie, Cleveland Trade School. Right view shows Principal D.C. Courtright, Cleveland Trade School, and Howard Heyl, Federal Foundry Supply Co., Cleveland. Second row, left to right, are John Parker, SPO Inc., Cleveland, and A. Lesley Gardner, Pangborn Corp., Hagerstown, Md., speakers; Charles H. Esgar, Foundry Educational Foundation, coffee speaker; Stephen E. Kelly, Eberhard Mfg. Co., Cleveland, chapter vice president; and E. B. Rich, American Wheelabrator & Equipment Corp., Mishawaka, Ind., speaker. Third row, left to right, are H. G. Robertson, American Steel Foundries, Alliance, O., national director, AFS; AFS President Wagner; Chapter President Cech; and AFS Secretary-Treasurer W. W. Maloney. Fourth row, left to rght, are Harry Jacobson, Industrial Pattern Works, Chicago, speaker at the Feb. 12 meeting; President Cech; Jerry Mercer, coffee speaker; and Jack Parker, M.P.M. Inc., Cleveland. Bottom row, left to right, at Feb. 12 meeting, are Fred Dunmire, Cleveland Board of Education; Walter Quayle, National Malleable & Steel Casting Co., Cleveland; Ed Kreager, Henry Furnace Co., Medina, O.; and Harvey Ennis, Associated Industries of Cleveland. Photos are by Sterling N. Farmer, Sand Products Corp., Cleveland

(*Continued from page* 274)

which include venting gases and the warpage of shells. He also discussed in some detail the use of resin coated sands in the production of shell cores.

Ted Burkland, foundry metallurgist for Deere & Co., was technical chairman.—*Eric Welander, John Deere Malleable Works.*

Northeastern Ohio

MEMBERS of Northeastern Ohio Chapter of the AFS were greatly interested in a talk, "Casting Quality as It Is Affected by Patternmaking," which was presented by Harry Jacobson, president, Industrial Pattern Works, Chicago, at the Feb. 11 meeting of the chapter held at Tudor Arms Hotel, Cleveland. In addition, Jerry Mercer, 1952 Mutual Security Agency Foundry Team member, who was the coffee speaker, discussed the activities of the MSA foundry team in France last year. He believes that their work accomplished a great deal of good and asked the audience to support such mutual aid programs in the future.

Mr. Jacobson, as technical speaker, pointed out that metal had made possible the greatest part of 20th century progress and now machines and tools, made possible by metal, have entered the automatic phase. That same change, he stated, is occurring in patternmaking, which is becoming more like die work.

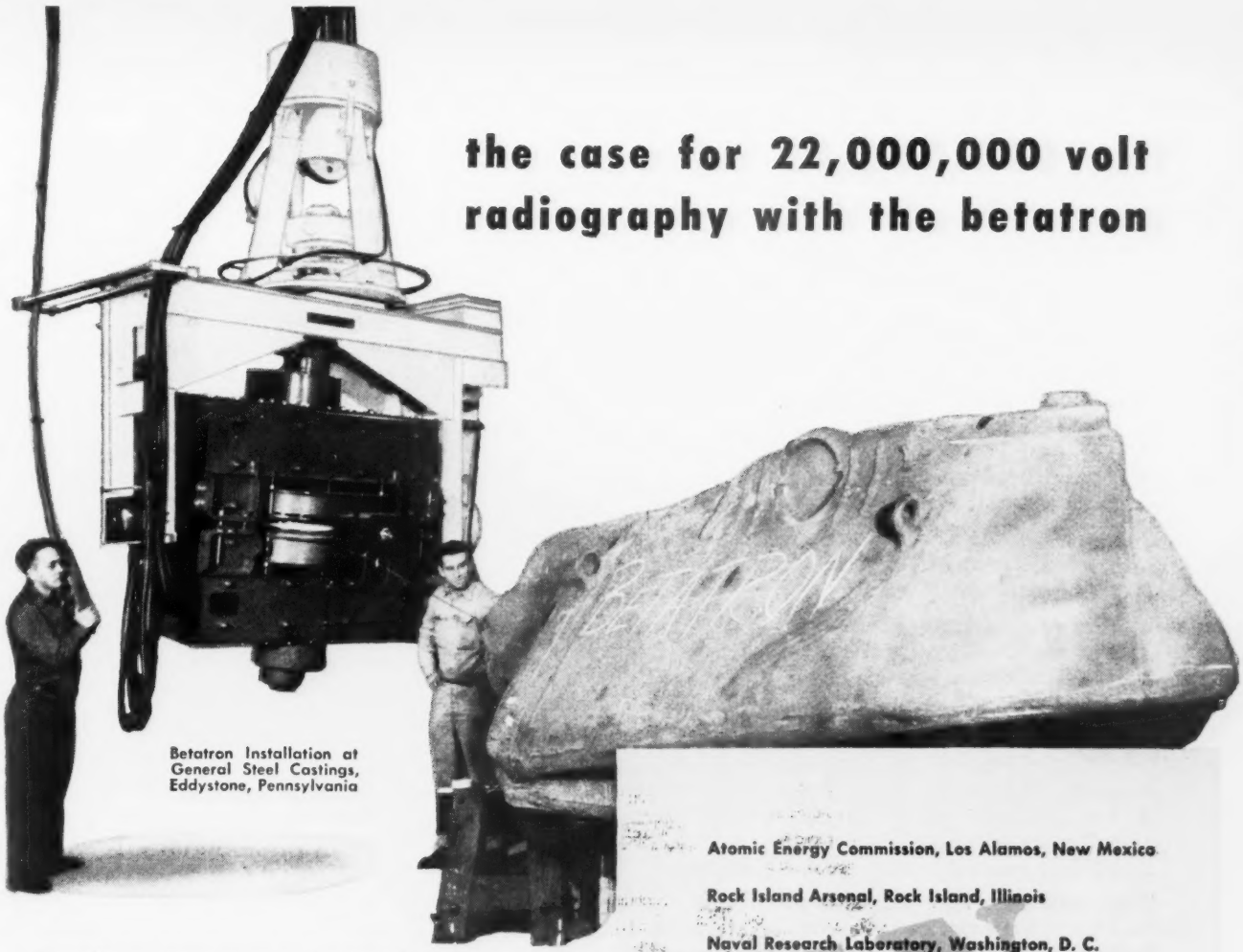
The first metal patterns, or dies, were made 40 years ago in the valve and fittings industry, and the electrocopperplating method of duplicating such patterns followed. Copper, however, is soft and expensive to maintain, therefore difficult to use economically with the automatic chucking that modern mass production calls for. As a result, Mr. Jacobson continued, aluminum patterns have been developed, although they are ordinarily not as accurate as copper duplicates, which are in fact *exact* duplicates.

Mr. Jacobson then described aluminum coreboxes being made by his company. They are resistant to abrasion yet do not use steel facing except in the blowhole. They give 0.005-in. tolerance and are true to the masters within 0.001-in. In addition they are cheaper to replace than to repair after the first two (enough for a year) have been made. They are practical, however, only for high-production runs of small castings such as valves and fittings, which require high tolerances.

A large turnout of chapter members marked National Officers Night at the Mar. 12 meeting of Northeast-

(*Continued on page* 278)

the case for 22,000,000 volt radiography with the betatron



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Continental Foundry, East Chicago, Indiana

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CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

(*Continued from page 276*)

ern Ohio Chapter of the AFS, at the Tudor Arms Hotel, Cleveland. National AFS officers present included President I. R. Wagner, Electric Steel Castings Co., Indianapolis; Secretary-Treasurer William W. Maloney, and Director H. G. Robertson, American Steel Foundries, Alliance, O.

Addressing the gathering, President Wagner complimented the chapter on its operation and activities. He noted that it is now the second largest AFS chapter and is pushing Chicago for the No. 1 position, having gained 105 members since September, 1952. He also announced the purchase of the site for the new AFS building in Des Plaines, Ill., a suburb of Chicago. Mr. Maloney then discussed the new building and expressed the belief it would be started soon and completed without further delay.

The chapter's entrants in the AFS apprenticeship contest were present as guests. Wood and metal pattern winners as well as ferrous and nonferrous casting winners were introduced and awarded their prizes.

Three representatives of foundry equipment manufacturing firms presented the technical portion of the program. A. Lesley Gardner, advertising manager, Pangborn Corp., Hagerstown, Md.; John S. Parker, sales manager, SPO Inc., Cleveland; and E. B. Rich, general sales manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind., explained the latest developments in cleaning and molding equipment and how that equipment can benefit the foundry industry. Mr. Gardner and Mr. Rich explained the development of centrifugal blast machines and Mr. Parker explained the meaning of "pushbutton molding" and how the equipment that makes this possible operates.—*Jack C. Miske*

Central Ohio

AT THE Mar. 9 meeting of Central Ohio Chapter of the AFS, held at the Seneca Hotel, Columbus, O., C. V. Nass, vice president of Beardsley & Piper Division of Pettibone Mulliken Corp. was principal speaker. His talk was entitled "Mechanization in Molding."

Mr. Nass stated that demands for mechanization in foundries differ. Some production foundries warrant extensive mechanization but others require little. He said it is as wrong to over-mechanize as to have too little, and he emphasized that any change made in a foundry should be part of an engineering plan. He illustrated his points with a motion picture taken at rep-

(*Continued on page 281*)

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- Has the grain-refining influence of chromium, yet eliminates the problems of chilled edges and loss of machinability.
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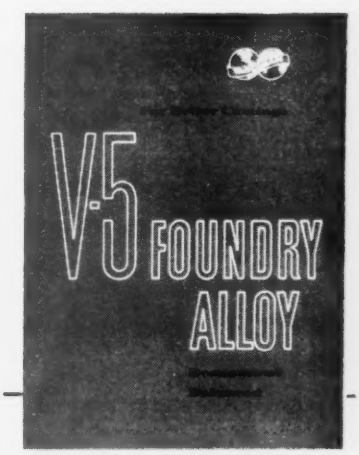

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MCA

(*Continued from page* 278)

resentative foundries. Simple as well as complicated and ingenious devices were illustrated.

The advantages of mechanization include savings in labor and materials, lessening fatigue, saving space and finally producing better castings.—*Wilfred H. White, Jackson Iron & Steel Co.*

Southern California

REGULAR meeting of Southern California Chapter of the AFS was held Mar. 13 at the Rodger Young Auditorium, Los Angeles. During the

SOUTHERN CALIFORNIA Chapter of the AFS met Mar. 13 to hear William S. Pellini, head, Metal Processing Branch, Metallurgy Division, Naval Research Laboratory, Washington

business meeting, it was announced that the chapter's board of directors, to stimulate interest in the apprentice contests, had authorized increasing the prize money awarded the local winners. New totals of prizes are $150 in the patternmaking division and $125 in the molding division. Winners of this year's contest will be announced at the April meeting.

Harold Chappie, National Supply Co., Torrance, Calif., and program chairman, introduced William S. Pellini, head of the Metal Processing Branch, Metallurgy Division, Naval Research Laboratory, Washington, who was the featured speaker. Mr. Pellini presented an interesting and informative illustrated lecture on "Engineering Aspects of the Performance of Castings and Weldments."—*K. F. Sheckler, Calmo Engineering Co.*

Central Indiana

SHELL molding is more versatile than many foundrymen have tended to regard it, Richard Herold asserted at the March meeting of Central Indiana Chapter of the AFS.

(*Continued on page* 284)

Shuttling between mixers and molding stations, and from shake-out floor to cleaning room and storage, Kwik-Mix Moto-Bug moves ¾-ton loads with one-man material-handling economy. As a power wheelbarrow, this low-cost foundry handyman hauls coke, core and molding sand . . . cleans up slag and scrap around ovens, shops and yards. Change to flat-bed platform, or 5-ft. fork lift, and Moto-Bug handles flasks, cores, finished castings. Check the *big savings* you can earn with a *small investment* in Moto-Bug. See Kwik-Mix distributor for a demonstration, or write us.

saves heavy work, makes man-hours more productive

- **Moto-Bug carries up to 10 cu. ft. (struck) in gravity-dump hopper**
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- **interchangeable ¾-ton platform, ½-ton (5-ft.) fork lift, scraper**

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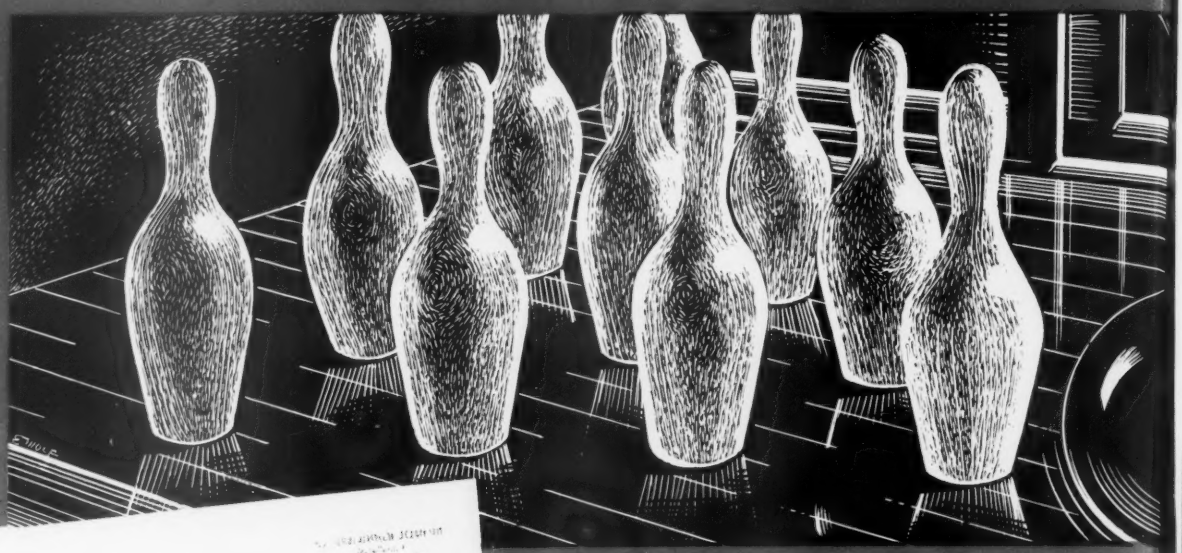

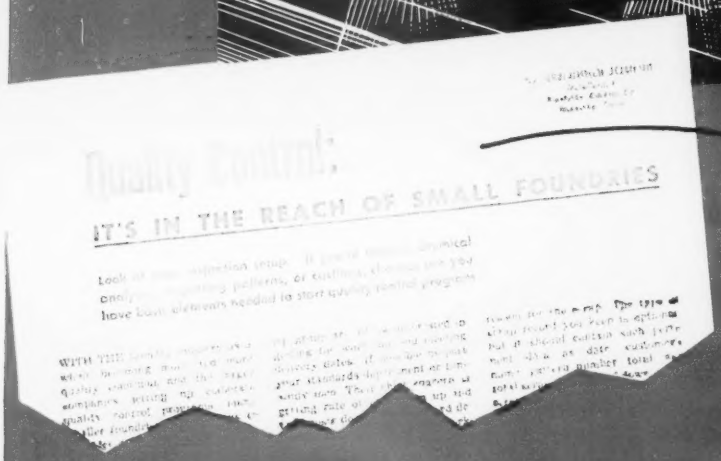

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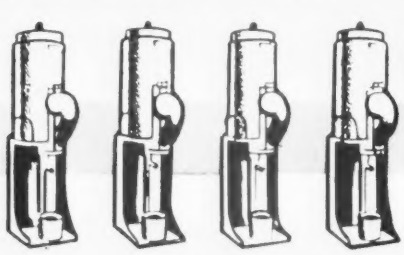

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Additive to core and molding sand; reduces scabbing, stops veins and fins in cores, improves finish; imparts higher flowability.

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Versatile chemically coated sand for green sand, skin-dried or dry sand molding. Maximum production, best finish, fewer types of sand needed.

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Pre-mixed refractory for patching cupolas by air placement. Eliminates human equation. Produces uniform, dense patch of maximum slag resistance at lower cost.

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Strong, refractory, durable and economical. Unusually high colloidal content. Since 1923, the standard of comparison for refractory bond clays.

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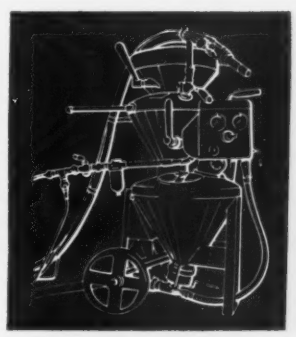

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streamlined contour—deflects objects more effectively and provides a greater safety "pocket" inside.

new suspension design—adjustable "hammock" headband is suspended *inside* at 6 points. No exposed rivets or lacing—no holes through hat.

comfortably cool—space between headband and shell provides ample air circulation for wearer.

moisture resistant—practically 100% waterproof and resists many caustics and acids.

Passes all required tests with an extra margin of safety!

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(*Continued from page* 281)

Mr. Herold, manager of the foundry products department, Borden Co., was guest speaker and his talk was entitled "Shell Molding Resin Binders."

The speaker pointed out that shell molding has been incorporated successfully as an integral part of large castings where critical dimensions must be maintained in some spots. The method has been successfully used with all cast metals with the exception of low-carbon steels and although there has been some fine work done with that metal, all the problems have not been answered.

Some of the advantages of the process which Mr. Herold cited were the reduced floor area for comparable productions; less sand consumption; reduced machining costs and a cleaner foundry. Mr. Herold said that work is now advancing on the reduction of mold support cost. Use of steel shot backing is being eliminated and the shells are merely glued, clamped or riveted for castings up to 15 lb.

In the following discussion, with Fred Carl, Fabricast Division of General Motors Corp., Bedford, Ind., as mediator, several interesting items were brought out. New interest is being taken in the blending of sands, and it has been found that an average 120-130 fineness is desirable but proper grain distribution is of utmost importance. Consumption of resins will increase as fineness of sand increases. Anywhere from 4 to 10 per cent resin is used depending on sand fineness.

When asked about release agents, Mr. Herold said silicone emulsions are being used because they break down more quickly. He also noted that liquid resins are under study.—*William H. Faust, Electric Steel Castings Co.*

Wisconsin

THE meeting of Wisconsin Chapter of the AFS held Mar. 13 at the Schroeder Hotel, Milwaukee, was designated Management Night. Dr. Russell D. Moberly, director of the Industrial Management Institute at the University of Wisconsin and an arbitrator on the National Labor Board of the American Arbitration Association, was the speaker.

Dr. Moberly pointed out that the foundry business has come a long way since the days when the head of the company knew every worker in the plant. The business has become more complex and the relations between the boss and the workers has become more vulnerable. Management tends to surround itself with a lot of "yes" men, and foremen and department managers usually are

(*Continued on page* 286)

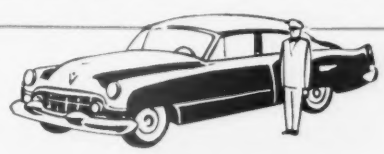
and those better BUFFALO PATTERNS"

Our fast shrinking world has also affected pattern buying. No longer is it smart business to sacrifice precision in order to buy in your own backyard, where you can "watch the job". While it is not necessary to come to Buffalo in order to buy Buffalo Patterns, most foundry men like to make "progress" checks on important jobs.

Profit-wise pattern buyers have discovered that it pays big dividends to come to Buffalo for their equipment, for here they have found a happy combination of the *new* and the *old*. Buffalo's is a *new* concept of complete Engineering service that plans *every* detail of *every* job, and an *old* concept of how to produce that job. Here you'll find not only better planning, but the kind of fine Craftsmanship that makes Buffalo Patterns fit your foundry and production schedules like the mechanism in a fine watch. There's *never* any adapting or extra rigging to do and your scrap ratio is always at a minimum. This means plus profits for your foundry and fewer headaches for the buyer. Why don't *you* try those better Buffalo Patterns?

BE OUR GUEST

Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.



Production and Experimental Pattern Equipment • Plastic and Wood Models, Precision Parts, Jigs and Templates • Shell Mold Pattern Equipment • Permanent Molds for Foundries, Injection Plastics and Reinforced Plastics • Engineering Drawings • Forging Dies • Non-Ferrous Castings • Shell Mold Castings • Metallizing

BUFFALO PATTERN WORKS, INC. • **832 HERTEL AVE., BUFFALO 16, N. Y.**

DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

UNIVERSITY OF ALABAMA Student Chapter of the AFS will use the 16 mm sound movie projector shown here in its FEF program. It was donated to the metallurgical engineering department by the late Fred K. Brown, left, former chairman of Birmingham AFS chapter; by Tom Benners, right, director, Birmingham Chapter; Howard Nelson, Hill & Griffith Co., and Concy Caldwell, Caldwell Foundry & Machine Co., Birmingham

(*Continued from page* 284)

satisfied if their particular department works in a satisfactory manner with little thought about co-operation among the various departments of the foundry. The speaker urged development of the management team along the lines of a football team, looking to overall efficiency of the plant rather than to each department. He cited an example of a foundry owner whose chief interest was in the inventions he had perfected, with the result the management of the foundry was left in the hands of foremen and department heads. Under those conditions the foundry did not operate efficiently. That foundry was sold and under the new management was made to pay through efficient management and co-operation.

Chapter President Joseph G. Risney, Risney Foundry Equipment Co., asked that names of foundrymen in the area who have been at the trade for 50 years or more and who are not now members of the Old Timers' Club, be given to the chapter so they may be enrolled in that organization and honored at the chapter's May meeting. There are now more than 100 members in the Old Timers' Club.—*John E. Hubel*

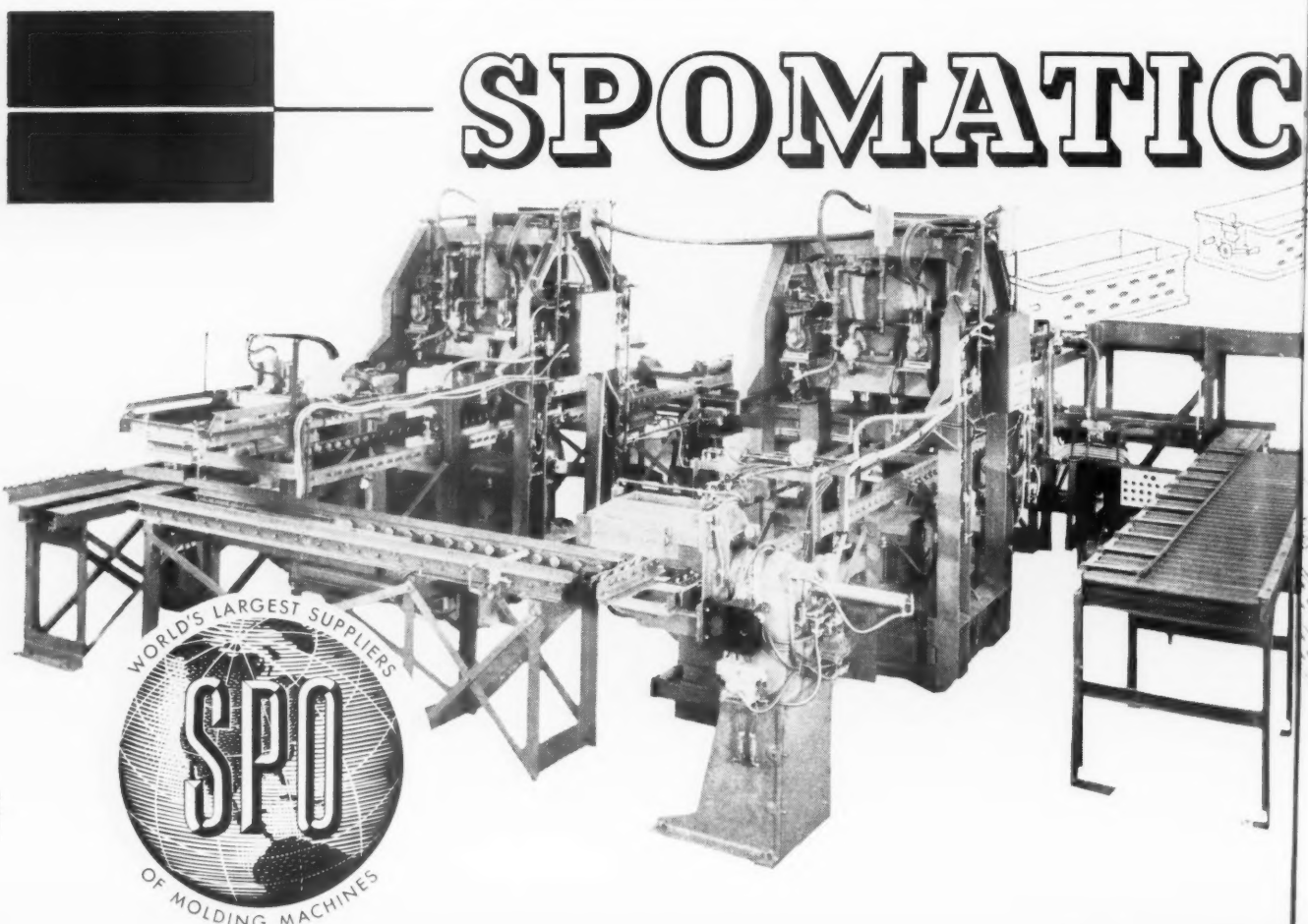
Northwestern Pennsylvania

MARCH meeting of Northwestern Pennsylvania Chapter of the AFS was arranged as Father and Son night and was held at the Erie Moose Club, Erie, Pa. Richard D. Agresti, a well-known Erie attorney who is also a commissioner of Little League baseball, outlined in an interesting lecture the methods of forming leagues, what they do for boys, and the final Little League World Series.

He pointed out that the teams are sponsored by local business men and service clubs, and that a call to him from anyone interested in this phase of boy's work would be welcome. He then presented a 30-minute film on "Little League Games." An additional feature of the program was the presentation of an extremely entertaining technicolor motion picture film entitled "Fishing in Florida."—*Roy A. Loder, Erie Malleable Iron Co.*

New Jersey

INCENTIVE methods, especially as applied at the Worthington Corp., Harrison, N. J., were discussed by Earl Miller, superintendent of foundry methods and standards, at the regular monthly meeting of the New Jer-



sey Foundrymen's Association, Feb. 16, Military Park Hotel, Newark, N. J.

Milton E. Annich, American Brake Shoe Co., Mahwah, N. J., George Price, American Abrasive Metals Co., Irvington, N. J., and Robert Fisher, Fisher Castings Co., Plainfield, N. J., also contributed to the discussion. Remarks covered wage incentives, applying not only to molders and coremakers, but to employees in other departments as well.—*B. K. Price*

Texas

FIFTY persons from seven Texas cities met at Beaumont, Tex., for the March meeting of Texas Chapter of the AFS. William Ball Jr., R. Lavin & Sons Inc., was the speaker and his subject was "Effective Essentials Required To Make Good Castings."

Rochester

MAR. 3 meeting of Rochester Chapter of the AFS was well attended. Oldsters such as Thomas Boyd, Medina Iron & Brass Co. and Karl C. Gruber, General Railway Signal Co.—each with 50 years of service in the industry—and newcomers to the industry were equally interested in a discussion of cores by J. H. King of Archer-Daniels-Midland Co.

ROCHESTER Chapter of the AFS met Mar. 3 at the Seneca Hotel, Rochester, N. Y. J. H. King, left, Archer-Daniels-Midland Co., spoke to the members of the chapter about the correct correlation of materials and the making of core sand mixtures. On the right is Andrew S. Coulter, Archer-Daniels-Midland Co., Buffalo

Mr. King stated that the core problem is the correlation of materials and mechanics of mixing core sand mixtures. When trouble occurs with cores, look for basic changes to cure the trouble. He pointed out that water is the cheapest core sand mixture ingredient and the most used and abused. Also, mixing sequences will cause a wide variance in the quality of cores. Mr. King stated that 2 per cent water for green strength is ample; also that the grains of 2000 lb of core sand have 90,000 sq ft of surface area and 1 per cent of oil will coat every grain with one micron of oil.

Small foundries can exercise control of variables by storing sand so it will not freeze or not have more than 2 per cent moisture. He recommended taking screen analysis for fineness and the use of standard measuring cans. Because cereal can vary, it should be weighed.—*H. G. Stellwagen, Hetzler Foundries Inc.*

Agents Elect Officers

Cleveland Chapter of the Manufacturers' Agents National Association has elected J. E. Goory, president; Fred F. Eisman, vice president, and David Rutledge, secretary and treasurer. W. A. Ursem and Harry Boulton have been elected delegates to the national association. New officers took office April 1, 1953.

HEART OF THE Automatic Foundry

The new SPOMATIC molding machine makes the automatic foundry of the future possible today!

This high-speed mass-production machine makes accurate copes and drags simultaneously . . . sets the cores . . . closes the molds . . . and puts them on the pouring conveyor. Then, after molds have been poured and put through the cooling cycle, the SPOMATIC knocks out, cleans, and separates the flasks and feeds them into their respective ramming unit for immediate re-use.

Once a SPOMATIC is started, *all operations are fully automatic, continuous and mechanical.* Complete operating cycle is set up quickly and easily by means of pushbutton-actuated electrical controls. Master control panel utilizes only two buttons ("ON" and "STOP") and three selector switches.

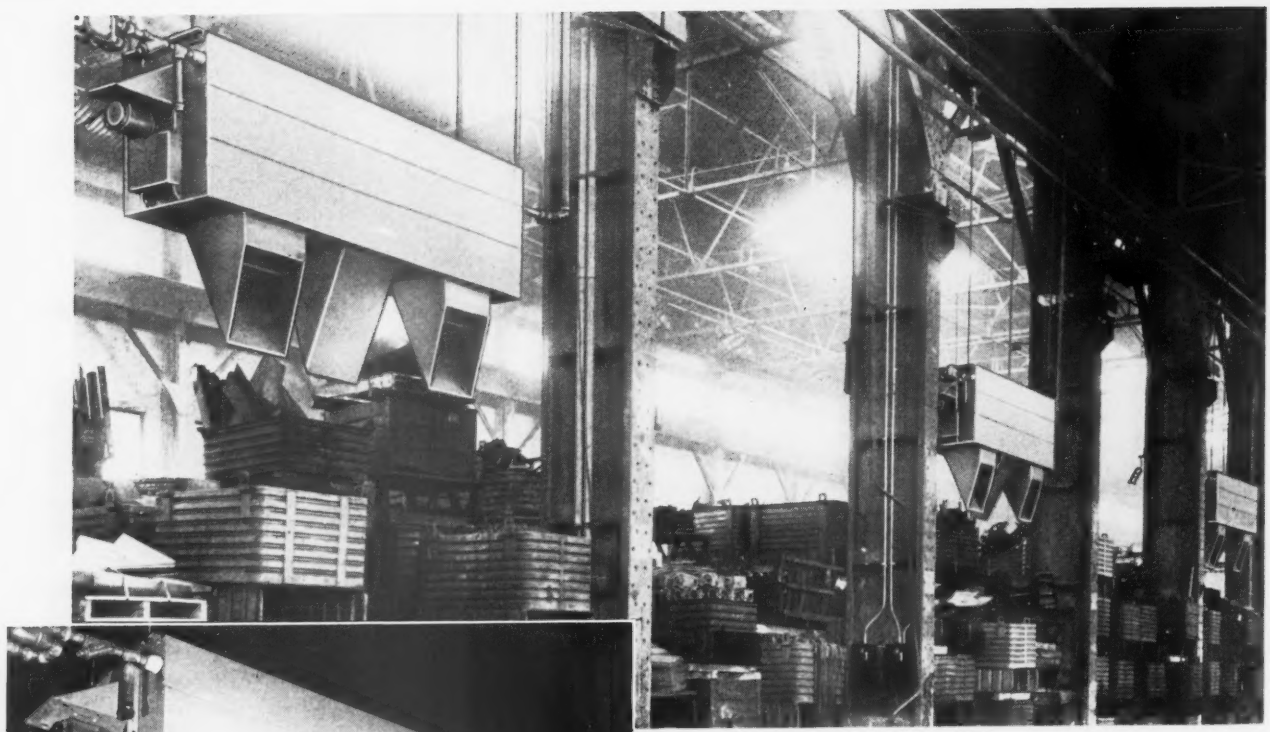
SPOMATIC installations are engineered to individual foundry requirements. SPO engineers will be glad to discuss your needs and to make recommendations. Write for additional information or call DIamond 1-3666.

SPO INCORPORATED

6449 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO

WRITE FOR BULLETIN "MM" FOR ADDITIONAL DETAILS

1152-SI



Above—Three centrifugal, fan-type unit heaters are part of a 60-unit overhead installation at the J. I. Case Co. foundry at Bettendorf, Iowa. As a group, the heaters supply 49 million Btu per hour

Left—One of three like it used, this single unit heater is of the three-fan type. Its 60-degree nozzle discharge can direct heat to the floor area

HEATING SYSTEM

Improves Foundry Working Conditions

WHEN investigation revealed that the heating system of the large foundry of the J. I. Case Co, Bettendorf, Iowa, was no longer adequate for the job, the company decided to replace it with a modern and efficient system. A new installation of 60 Herman Nelson centrifugal, fan-type unit heaters will furnish the 430,000 sq ft of the building with 49 million Btu per hour.

The new unit heaters incorporate a 60-degree nozzle discharge that permits the heat to be directed to the floor area, something not possible with the old heaters. Because they are suspended 12 ft above the floor area, they release for productive use a large amount of floor space formerly required by the old heaters. The excellent heat distribution of the new units will permit a section of the foundry to be turned into an assembly area for two of the company's products—a forage harvester and a corn picker.

Management anticipates a sharp upturn in employee morale as the result of this new, modern heating installation. The foundry is only one building in the J. I. Case installation, which skirts the Mississippi river front in Bettendorf, but the new heating system will serve to put working conditions of the 600 foundry employees on a level closer to that of other workers.

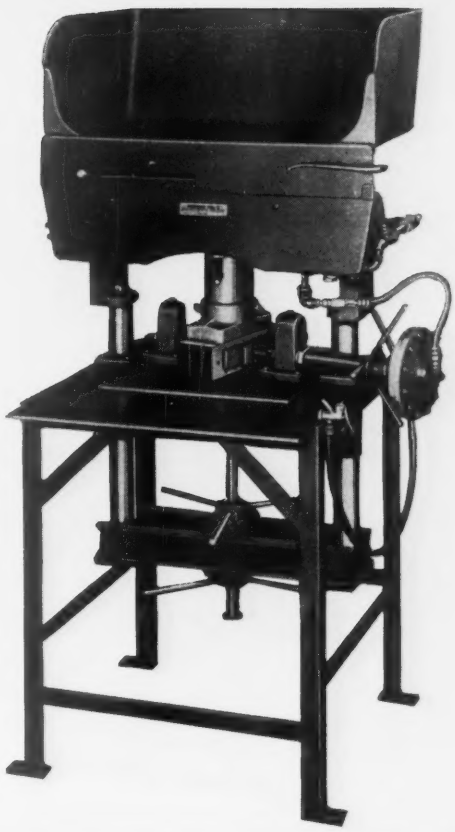
In the new heating installation 40 of the centrifugal fan-type heaters are the four-fan type. They utilize a 1-hp electric motor and have a fan speed of 1,165 rpm. Seventeen of the heaters are three-fan units. Each of these is driven by a ½-hp electric motor and has a fan speed of 440 rpm. The remaining three units are also the three-fan type, but have 1-hp electric motors and a fan speed of 1,175 rpm.

At present, steam for the units is supplied by two boilers, each with a capacity of 20,000 lb per hour. The 24 heaters now connected into the steam supply are serviced by these boilers. However, two new boiler units, supplying 60,000 lb of steam per hour, will replace the present boilers and service all 60 of the centrifugal, fan-type unit heaters.

Original steam pressure at the boilers is 450 psi. This pressure is reduced to 100 psi at four pressure reducing valves, then again reduced to supply each heater at 25 psi.

Redford CORE BLOWERS

Assure MAXIMUM Production With MINIMUM Effort



THE NO. 2 STATIONARY MAGAZINE TYPE

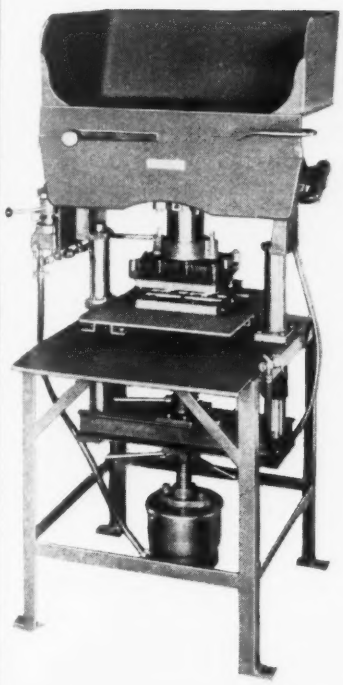
8 OUTSTANDING FEATURES:

1. Large stationary work area.
2. Large sand supply hopper.
3. Stationary sand magazine.
4. Easy accurate locating of core boxes.
5. Quick change magazine heads.
6. Quick adjustment for different height core boxes.
7. Quick change, fully adjustable, vertical clamping attachment.
8. Actuating one handle clamps the core box, blows the core and releases the core box, in two seconds.

CAPACITY: Cores up to 5#

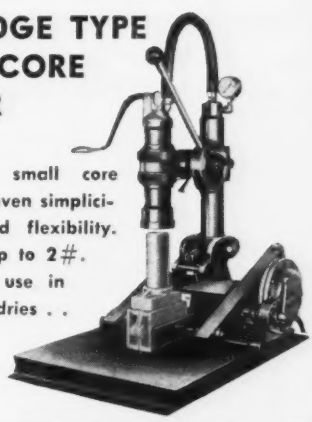
Write for Specification Bulletin "F"

THE No. 2-D CORE BLOWER



A fast and accurate DRAW TYPE core blower for small work—has stationary sand magazine and many additional features assuring maximum production. Quickly adjusted to accommodate core boxes not requiring the draw feature. Can be equipped with clamping attachment for vertically split core boxes.

THE CARTRIDGE TYPE BENCH CORE BLOWER



The original small core blower . . . Proven simplicity, speed and flexibility. Makes cores up to 2#. Thousands in use in American Foundries . .

Write for Specification Bulletin "G"

SIX FEATURES:

1. MAXIMUM SAFETY—Operator must use both hands at once to clamp core box and blow cores.
2. ACCURATE DRAW—Stationary sand magazine and long lead on draw table shaft assure accurate draw.
3. ADJUSTABLE LENGTH OF DRAW—Quickly changed without changing height of table.
4. FLEXIBILITY—Easy adjustments permit use of draw feature even on short run jobs. Draw type magazine heads having removable blow plates are interchangeable with regular No. 2 magazine heads.
5. CORE BOX VIBRATION—Controlled by keeping draw valve handle depressed during draw operation.
6. PROVEN—The No. 2-D is being used in leading foundries everywhere. Backed by the Redford reputation for quality equipment.

Write for Specification Bulletin "D"

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • Phone KEnwood 1-8611 • DETROIT 23, MICHIGAN

Adventures of Bill

By PAT DWYER

Illustrations by RICHEY

MORE for the purpose of making conversation than because I entertained any doubt on the subject, I asked Bill the other night if he had made all necessary preparations for attending the coming AFS convention in Chicago, May 4 to 8. To my certain knowledge he always had looked forward to this event as a positive must on the annual program.

He had missed a few in the early years when, like all the young gay cats he had no permanent address, and before he gave up riding the freights and joined the great majority who insist on riding the cushions and paying for the privilege. His reply to my civil question was not what I expected.

"I am not quite sure," he said, "whether I shall or shall not favor the affair with my presence this year."

"What's that?" I exclaimed in astonishment. "You mean it's a toss-up whether you join the great hegira that soon will be rolling into Chicago?"

"You heard me the first time, although I don't remember saying anything about a hegira, whatever it is."

"Would I be straining the lifelong bonds of friendship to the elastic limit or the ultimate yield point, or any other suitable item of comparison, if I ventured to inquire what event, or, no doubt a series of events, reduced you to a condition where you don't seem to know whether you are coming or going?"

"I fear my fingers will not pass the entrance examination."

"All right. I give up. You have the same number and style of fingers you always had. You will not be asked to twiddle the tumblers and open the City Hall safe, a la Jimmy Valentine. Practically all the hotels and restaurants are equipped with dishes, knives, forks and spoons. The practice of grabbing the food with the finger is no longer necessary. Therefore, what have your fingers to do with your decision to go or not to go to Chicago?"

"Plenty, my boy, plenty and then some. One night last week while engaged in my favorite occupation of doing nothing, the Little Pal approached to show me an article she had been reading in a more or less popular magazine. The article was spread over a whole page and was headed "Care Of The Hands." I have done a little in a kind of an amateur way at the ancient and honorable art of holding hands. Thinking I might increase my knowledge of the gentle and fascinating pastime, I grasped the magazine firmly, and carefully perused the aforesaid article from beginning to end. I was grievously disappointed. Not a jot or tittle, a smidgen, or a trace of romance.

"The prevailing idea seemed to be that the hands are the most ornamental part of one's person, and the polishing, staining and primping of them the most important part of one's existence. The article included a complete list of the necessary tools and appliances; a detailed chart and description of the correct shape each nail was to be pruned and whittled into; a lengthy array (in color) of the different lotions, abrasives and lubricants to be employed; and an earnest plea to exercise great caution in permitting any professional manicurist to work on the project. Many of these so-called performers are very rough. They have neither the delicate touch nor the poetic temperament so essential to the proper performance of the delicate operation. In conclusion, the author pointed out that once the hands had been cultivated to the proper shape and condition, an hour morning and evening would be sufficient time to devote to their satisfactory maintenance. When I had read it all the way through, the party of the second part inquired gently, "And what do you know about that?"

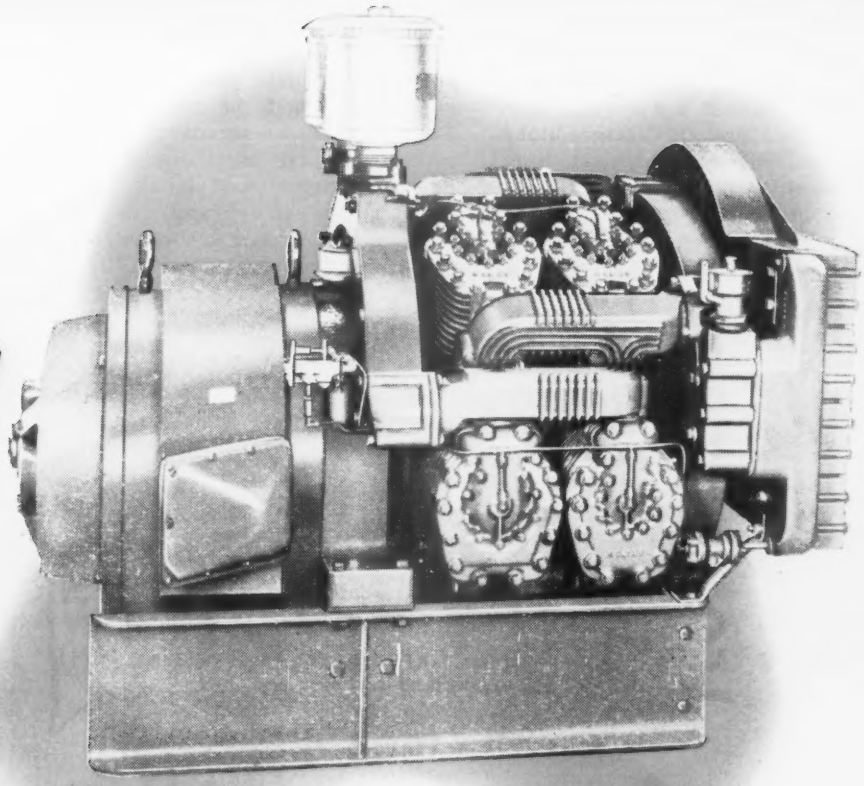
"I fixed her with a glittering eye —of course I used both eyes, but a glittering eye sounds better—and said I knew as much about it as she did and that was nothing, with the possible exception that the author never had worked in a foundry. As a sudden suspicion flashed into my mind, I again brought the glittering eye into action. "Listen," I said, "if you have any underhand intention of inflicting one of these manicure things on me for a Christmas present, I'll give you a friendly tip. See to it that a small emery stone is included in the outfit. I could fasten it on the sewing machine and grind off the roughest or outside scale before applying the finishing tools.

"When I was a young lad I never

(*Continued on page* 292)

Some one should tell him about the sandblast and blow torch

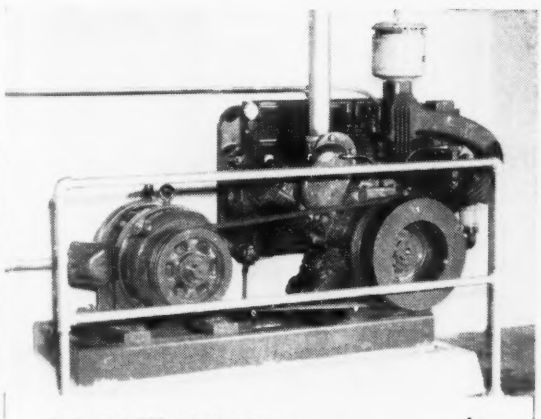
JOY WL-80 COMPRESSOR with automatic start and stop control



A Real "Package-Unit"

Joy WL-80's are ideal for the smaller air-requirement jobs, or for de-centralized air supply, etc. These two-stage, air-cooled units are delivered ready-to-go, complete with air receivers, piping and wiring if you wish—just hook them up to power and air lines. Extremely compact and efficient, a WL-80 will fit into any small corner of your plant. You can eliminate long runs of piping; compress the air right where you use it. Available in eleven sizes from 15 to 125 HP, 81 to 641 CFM, with pressures to 125 PSI, for service indoors or out. ● *Write for Bulletin A-56.*

Joy also makes a complete line of Oil-Free Compressors for applications where air must be free of any lubricant. *Write for details.*



JOY COMPRESSORS **meet any need!**

Air-cooled or heavy duty water-cooled; complete range from 1.4 to 8800 CFM, ¼ to 600 HP.

Consult a Joy Engineer

Over 100 Years of Engineering Leadership

WAD I 4060

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

(*Continued from page* 290)

washed my hands, except under violent protest. Many a vigorous half-hour my mother spent in scrubbing me and lamenting the fact she was afflicted with such a young barbarian. The trait probably is hereditary and passed on as a judgment from one generation to another. For exhibit *A* in support of this claim I have twin eight-year-old grandsons who are even as I was, only worse. Their mother declares it costs more in soap trying to keep them clean than it does for food, clothes and a sturdy roof over their heads.

"So far as my experience goes, a man is not disgraced because he gets his hands dirty, but there is a decided and definite prejudice against getting the hands in that condition. The general movement is toward some way, any way except soiled hands, to meet the claims of the butcher, the baker and their old crony and side kick the candlestick-maker. I may be mistaken, but I don't think a pair of hands was fastened to every human body simply as ornaments. They were meant to be used. They have been used by the majority of mankind ever since Eve plucked the forbidden fruit and tricked poor simple Adam into taking one bite, very likely on the wormy side.

"Away back in the ancient days when every man was his own boss, each one used his hands to furnish protection, food and clothing for himself and family. If we are to believe all we hear and read, these gents had big, hairy claws which would do justice to a grizzly bear. Probably they manicured them the same way the bear does, by whetting or stropping them on a convenient tree trunk. Without belittling the work of the great thinkers, poets, philosophers and men of science, I think a certain amount of credit should be given the toilers, the hewers of wood and the drawers of water. It is just as necessary for a man to eat as it is to be able to dig up Greek and Latin roots on a literary farm. Cleanliness and sanitation are all right, but there is no sense in carrying them to extremes.

"As for being ashamed of the signs of toil, well, a certain old gentleman, name of Longfellow, a journeyman poet rated A1 at Lloyd's, touched upon this point. He was referring to a blacksmith, but blacksmiths, molders, machinists, boilermakers and all the other industrial boys are the same in Dutch. Mr. *L* struck his lyre and caroled merrily: 'His hair is crisp and black and long. His face is like the tan. He looks the whole world in the face, for he owes not any man!' "

"There you are Bill," I said. "There is your visa and passport for Chicago. Your hair is not crisp and black and long, and your face looks more like a ripe tomato than a hunk of tanbark, but I would not hesitate a moment in backing you in a looking-the-whole-world-in-the-face contest with any horny-handed blacksmith who ever beat out a ring-dan-do rhythm on an anvil. No person is going to demand that you show your fingers or your finger prints. Have you had any experience recently that would be worthy of a place on the general program if and when you get in?"

"Well," Bill said, "I'll tell you. I had some correspondence recently that might be of interest. Stick around and keep quiet and I'll read it to you:

In connection with our regular business we operate a free research service for our industrial customers. Recently a client submitted the following problem: The firebrick lining in the melting zone of our 42-in.-diameter cupola has to be replaced

(*Continued on page* 295)

Want core plates that SAVE MONEY?

. . . then use TRANSITE CORE PLATES for easy handling, low maintenance, long life!

You get real long term economy with Transite* Core Plates. Their initial cost is low . . . and their maintenance cost negligible. Transite Core Plates are tough and corrosion-resistant. They are made from an asbestos and cement composition by a special Johns-Manville process. They resist shock and corrosion . . . will not crack or break easily.

Here are other important reasons for using Transite Core Plates:

THEY SPEED PRODUCTION—
Transite Core Plates are easily handled. They're simple to clean, too, since core wash, sand, etc. do not adhere to them as readily as to other core plate materials.

THEY MAINTAIN ACCURACY—
Foundrymen who have used Transite Core Plates for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, New York.

JOHNS MANVILLE JM PRODUCTS

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES
Made of Asbestos

O'Dell & Shields photo—courtesy of Indianapolis Motor Speedway Corp.

INDIANAPOLIS

foundry market area number five

Indianapolis turns out approximately three quarters of a million tons of castings annually, with emphasis on agricultural, automotive and machine tool production. 40 of the area's 107 foundries employ 100 or more workers, with total employment just short of 20,000. Many of the 61 gray iron shops in the Indianapolis area keep cleaning costs to a minimum by using ANNEALSHOT and/or SUPER-ANNEALSHOT. If you, too, are interested in better, more economical shot-cleaning, call in your Metal Blast representative, or write direct to **Metal Blast, Inc.,** 872 East 67th Street, Cleveland 3, Ohio.

ANNEALSHOT
chilled shot and grit

SUPER-ANNEALSHOT
malleable shot and grit

GUARANTEE: *If you don't find Metal Blast abrasives the best and most economical you've ever used—you may return the unused quantity for refund, at our expense.*

Statistics from Penton's HOW TO SELL THE FOUNDRY MARKET

Why *Brass* can better serve your needs

Resistance to CORROSION

Brass Castings Retard the Destructive Forces of Nature

SHIPBUILDERS require strong . . . ductile . . . corrosion resistant metal for propellers.

IN INDUSTRY brass is selected to convey corrosive liquids.

AT HOME or wherever liquids are used . . . Brass plays a necessary role.

FREE . . . Write for your copy of the 8-page "Lavingot Technical Journal — Vol. 9, No. 1 — containing an article discussing "Silicon Bronze."

Specify—LAVIN NONFERROUS INGOT—*Quality*

Brass · Aluminum · Bronze · Zinc Base Die Casting Alloys

R. LAVIN & SONS, INC.

- *Refiners of Brass, Bronze and Aluminum*
- *Producers of Zinc Base Die Casting Alloys*

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REPRESENTATIVES IN PRINCIPAL CITIES

R. LAVIN & SONS, INC. 1900 53 Years 1953 SERVING THE FOUNDRY INDUSTRY

(*Continued from page* 292)

every few weeks. The cupola is charged with alternate layers of limestone, coke and metal, 50 per cent scrap steel and 50 per cent pig iron. The charge door is 10 feet above the bottom of the cupola which allows only four charges. The forced draft entering through the tueres in the melting zone is activated by a 20-hp No. 4 blower. Temperature of the molten metal as it leaves the cupola is 3000 degrees. We have tried all the best quality brick. They all burn out much more rapidly than in other installations on which we have had reports. If we raised the charge door to 20 feet above the bottom, thus allowing for six or eight charges, would that solve our problem?

"We cannot see any necessity or advantage in routing questions and answers through the hands of a third party. We can see two distinct disadvantages. First we get no credit for supplying the information. Second, in the transmittal of correspondence by a third party admittedly ignorant of the subject under discussion, there is danger of misunderstanding. In this particular instance the phraseology of the inquiry indicates that the inquirer is not a practical foundryman and is not familiar with foundry terms or with the operation of a cupola.

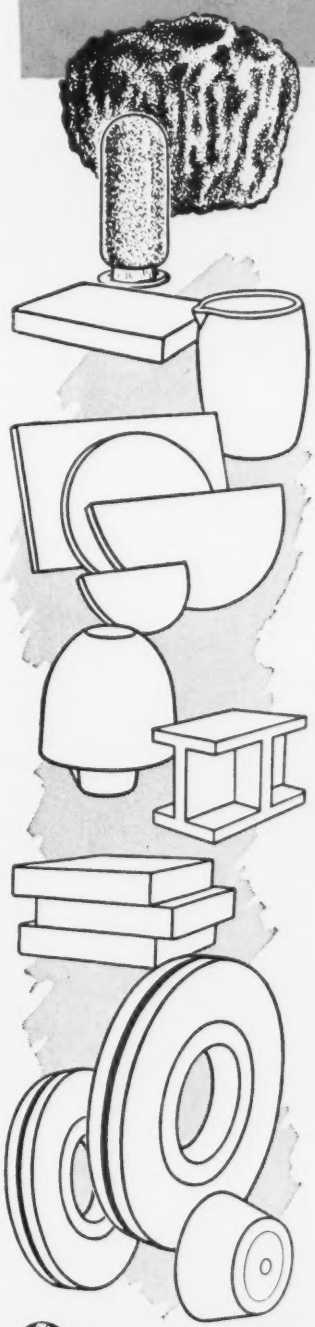
"The statement is made that iron leaves the cupola at 3000 degrees. Without quibbling over the possibility of whether this means *F* or *C*, the statement is preposterous. Temperature of the metal is only one factor bearing on the burning of the brick lining. Since gray iron does not leave any cupola tap hole at 3000° F, that factor is of no use in attempting a diagnosis. The same paragraph states that the draft entering the tuyeres in the melting zone is actuated by a 20-hp No. 4 blower. That statement in itself indicates that the questioner is not competent to investigate the problem. In the foundry the air entering the cupola is referred to as the "blast" or the "wind," and not as a "draft." Entrance ports for the blast are spelled "tuyeres" and not "tueres." The two words have the same sound, but a person familiar with the cupola knows there is a difference in the spelling. Air pressure and volume are important factors in lining life. A bare statement that a No. 4 blower is driven by a 20-hp motor is useless as information. A blower may be hooked up to operate at various speeds, with a corresponding variation in the pressure and volume of air delivered.

"Several other points might be touched upon in support of our contention that the inquirer is not in position to either give or receive information. For example, he states the cupola is 42 in. in diameter, but

(*Concluded on page* 297)

HIGHLY SPECIALIZED INFORMATION AVAILABLE on these..

Electro TRADE-MARK SINCE 1919



PRODUCTS

IN FIRST STAGE FORM, AS:

Versatile Man-Made Mineral . . . ELECTROCARB (Silicon Carbide) GRAIN, of many uniform sizes.

BRIQUETS, deoxidizer for iron castings.

IN MANUFACTURED FORM, AS:

CRUCIBLES for melting metals. Tercod is the original silicon carbide crucible.

REFRACTORY Special Shapes and Brick, also Cements, for conducting heat at high temperatures; high load bearing strength, resistant to abrasion and thermal shock.

GRINDING WHEELS for Specific Purposes, both high speed resinoid and standard speed vitrified for nearly all grinding or cutting-off needs.

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is our role!

On the seas, in a foundry or a steel plant . . . *control* is essential. It's the chief role of Keokuk Electro-Silvery in charging the cupola or blocking the open hearth. For with Keokuk, you are *assured* of *accurate* percentages of silicon . . . and, as suits your melt, alloys of manganese, chrome or nickel in various combinations. So, control both quality and costs with Keokuk. Write today for complete information!

KEOKUK
ELECTRO-METALS COMPANY
Keokuk, Iowa
Wenatchee Division: Wenatchee, Washington

In sailing, much depends upon control. Here, Chief Keokuk handles the tiller; Junior, the boom; and Princess Wenatchee makes ballasting an eye-popping pleasure!

Keokuk Electro-Silvery . . . available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

SALES AGENTS: MILLER AND COMPANY
332 S. Michigan Ave., Chicago 4, Illinois • 3504 Carew Tower, Cincinnati 2, Ohio • 915 Olive St., St. Louis 1, Missouri.

(*Concluded from page* 295)

does not specify whether the dimension is inside the lining or outside the shell. Diameter of the shell does not convey any information. Melting speed or capacity of a cupola is based on the inside diameter or area, and this may vary to a considerable extent depending on the thickness of the brick lining. To venture an opinion on the active life of a brick lining, it would be necessary to know how many hours the cupola is in operation each day. Usually when a cupola is melting continuously all day, the lining burns back to such an extent it is necessary to replace at least one layer of bricks or cupola blocks in the melting zone every morning. If the cupola is operating on short heats—one or two hours each day—a thin daubing of mud every day will keep the lining in repair for a year or more. These may be regarded as the two extremes. Several years ago in FOUNDRY a superintendent claimed he ran a heavy heat every day and had not replaced a brick for three years.

"Components of the cupola charge are listed as limestone, coke and metal. The items are not listed in the manner favored by shop custom. Since limestone is the least in quantity it is placed last. For the same reason the metal part of the charge is mentioned first. This is only a minor feature, but in combination with the others it indicates the inquirer's lack of familiarity with the subject. A charge composed of 50 per cent steel scrap and 50 per cent pig iron is possible, but it is so unusual that the accuracy of the statement is doubtful. Suggestion to raise the charging door is further indication of amateur thinking. Metal is melted a short distance above the tuyeres irrespective of whether the charging door is 6 feet or 20 feet above the sand bottom of the cupola."

Book Review

Atmospheric Pollution, by A. R. Meetham, D. Sc., cloth, 268 pages, 5½ x 8½ in., published by Pergamon Press Ltd., London, England. Price $4.90.

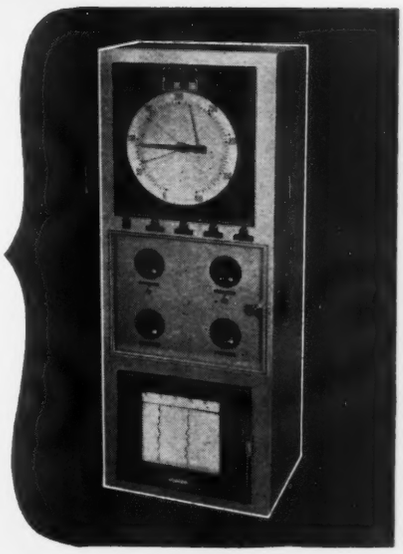
Meant both for private citizens who are aware of the problem of atmospheric pollution and for all persons professionally interested in the subject, this volume is concerned primarily with pollution from the combustion of coal and its derived fuels.

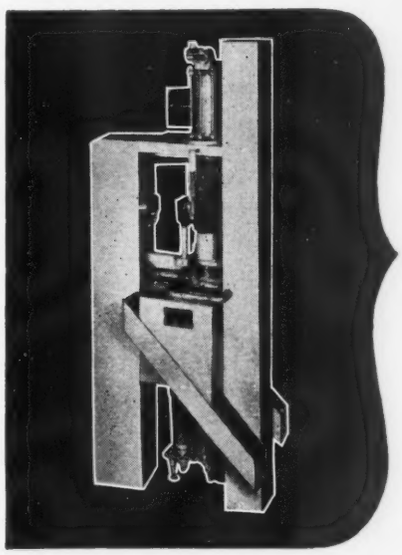
The first portions are devoted to fuels, furnaces and fires, which are treated briefly, but as thoroughly as the space available permits. Subsequent chapters contain a study of the properties of atmospheric pollution and remedial measures.

DIETERT-DETROIT
AUTOMATIC
SAND CONTROL

WATERTEMP CONTROL

Eliminates Wet and Dry Batches
Positive Moisture Control
Minimizes Hot Sand Problem
Insures Uniform Mulling
In Step with Short Cycles
Adds Base Water to Temper
Adds Evaporation Water to Cool
Handles Slurry Effectively





SAND CONTROLLER

Controls Workability of Sand
Exact Moisture Control
Every Batch "Feels" Alike
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Ideal for Facing Mixes
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Records Sand Properties

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Dietert Sand Controllers regulate sand properties before the sand leaves the muller.

LITERATURE AND PRICES ARE AVAILABLE ON REQUEST

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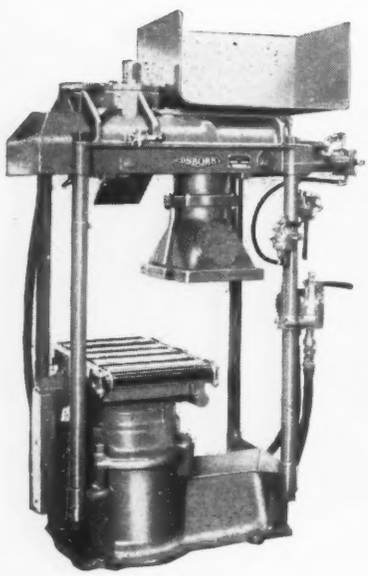
OSBORN MOLDINGA

...a right e

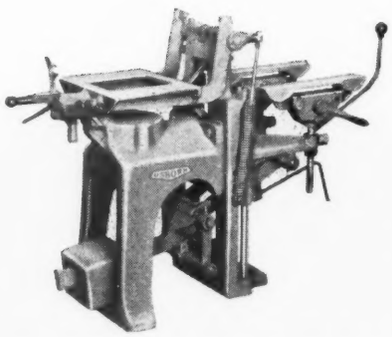
• CORE BLOWERS

Manual or Automatic Controls

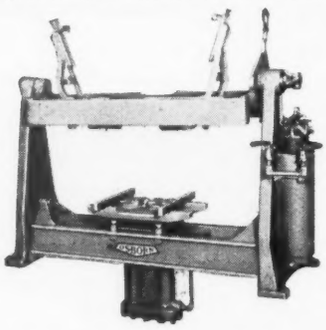


Draw Piston Type

Diaphragm Type



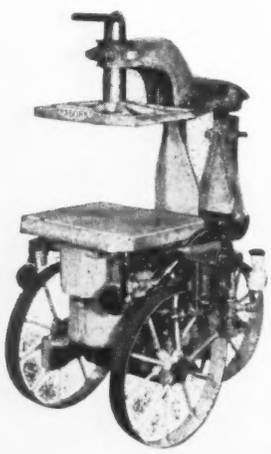
Hand Operated Rockover Core Machine

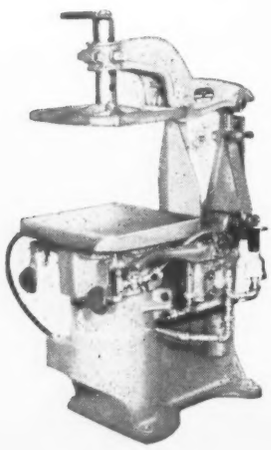


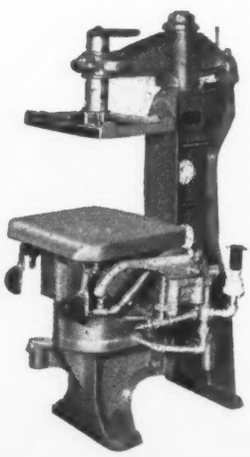
Core Box Rollover Drawing Machine

• SQUEEZERS

Portable or Stationary—Cantilever or Post Type







Many types not illustrated. Write for complete information on other Osborn machines.

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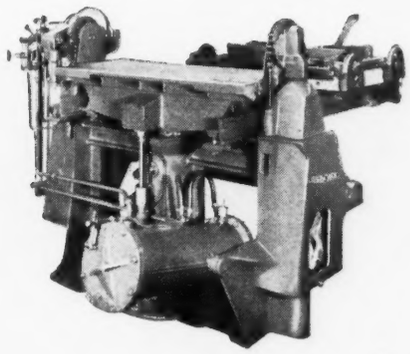
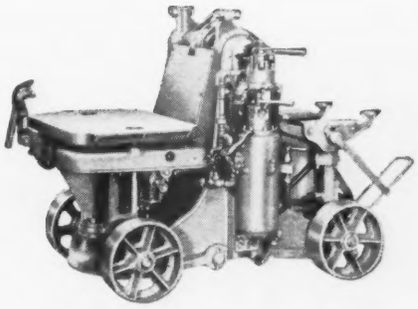
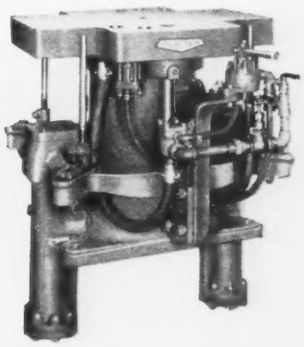
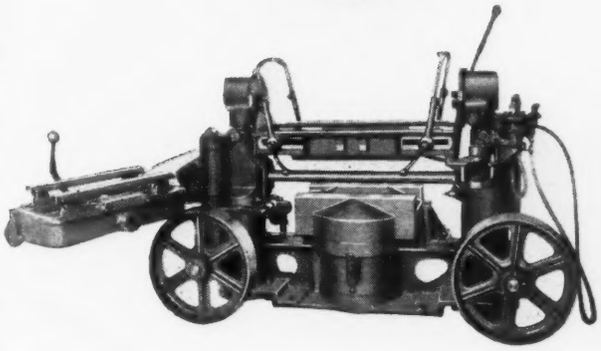
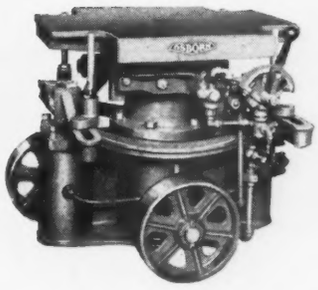
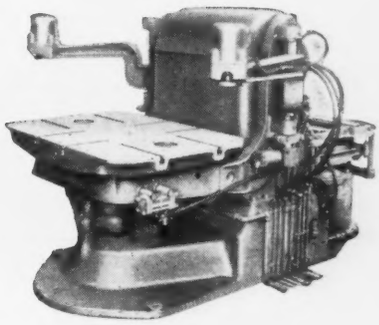


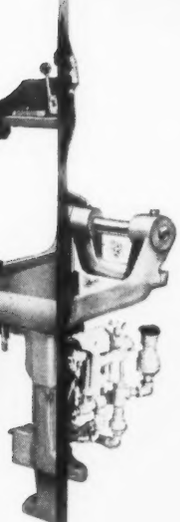




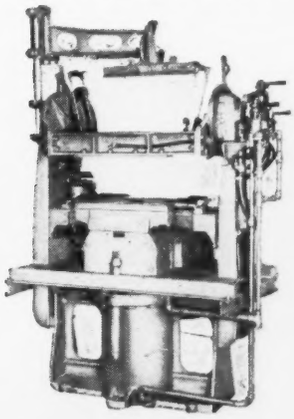


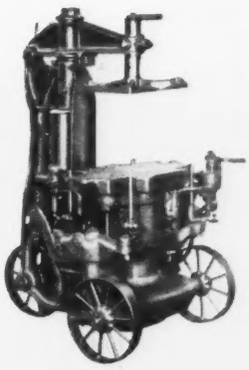


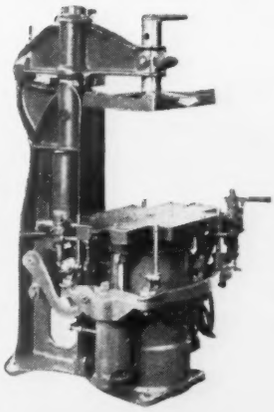


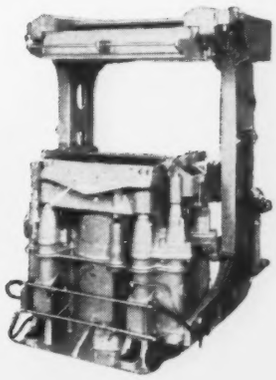


JOLT ROLLOVER SQUEEZE JOLT SQUEEZE STRIPPERS









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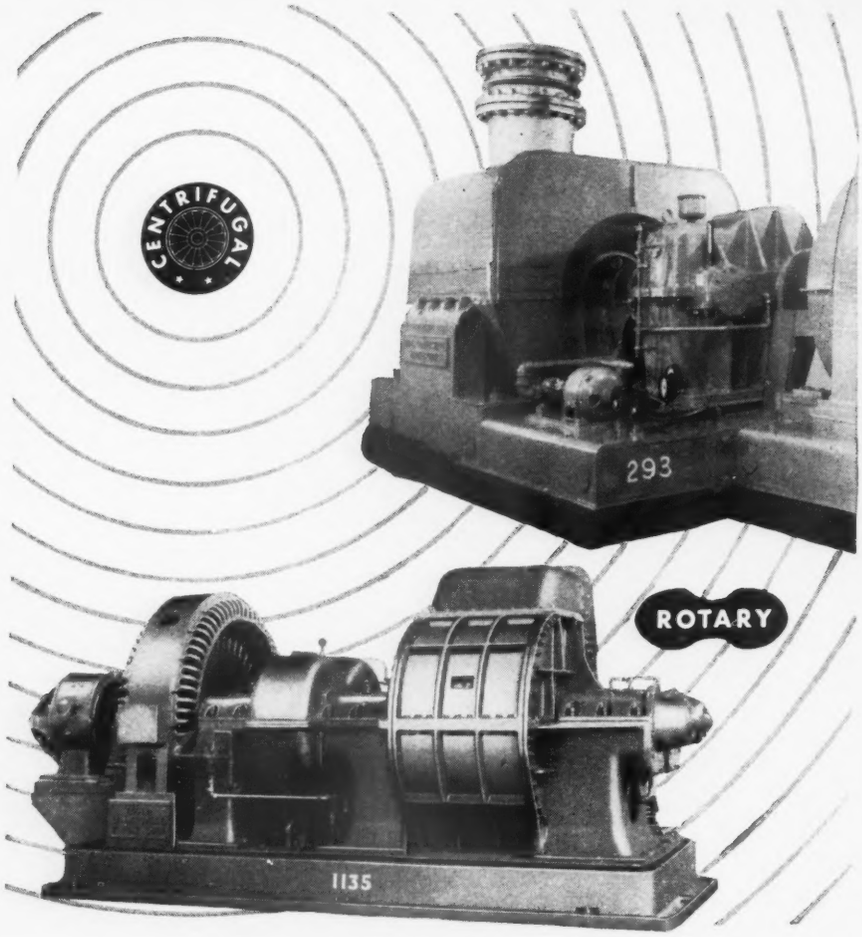

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To meet the varying problems of handling air or gas, in industrial processes, Roots-Connersville builds two complete lines of blowers and exhausters—Rotary Positive and Centrifugal. Together, they cover capacity requirements from 5 cfm to 100,000 cfm in single units. Centrifugals are available in multi-stage units, as illustrated, or in single-stage types.

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In addition to blowers and exhausters, R-C products include a wide range of gas and vacuum pumps, meters, inert gas generators and other related equipment. So, whenever you have a need for moving or measuring gas or air, we suggest consultation with the R-C Specialists.

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Eastern Apprenticeship Conference in May

The New Hampshire Apprenticeship Council will be host to the Ninth Annual Eastern Seaboard Apprenticeship Conference, at Wentworth-by-the-Sea Hotel, Portsmouth, N. H., May 27-29, 1953. The conference opens with a general meeting Wednesday evening, May 27, and closes with the annual banquet on Friday, May 29.

Registration will open at 2 p.m. Wednesday, followed by the general meeting at 8 p.m. On Thursday, May 28, three general meetings for the building and construction industry, manufacturing industries and graphic arts industry will be held from 10 a.m. to noon and from 2:30 to 4:30 p.m.

Friday morning, May 29, there will be six sectional meetings for the foundry trades, building trades, textile industry, machine tool industry, railroads and automotive industry from 10 a.m. to noon. In the afternoon, from 2:30 to 4:30, the Eastern Seaboard Training Directors Association, state apprenticeship councils and vocational education groups will hold special meetings. The annual banquet will be held at 6:30 p.m. on Friday.

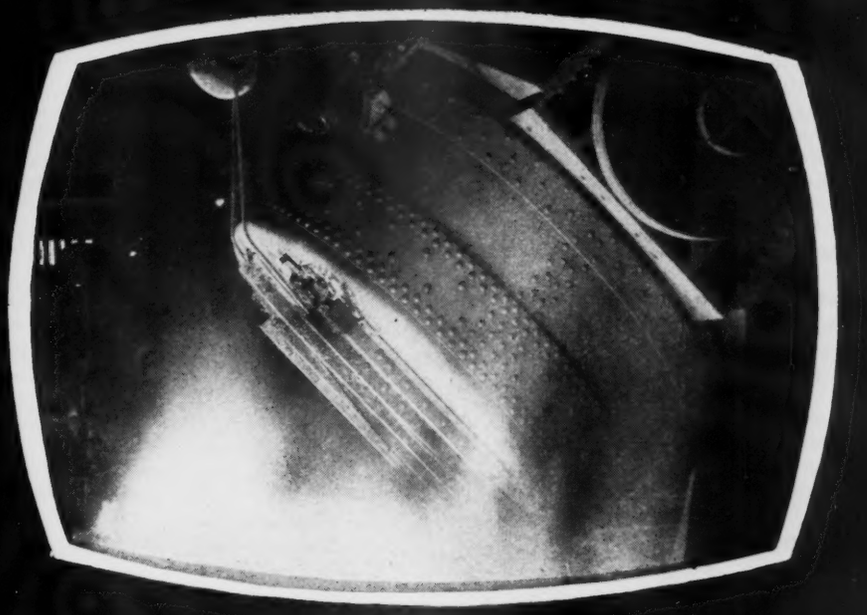
Reservations or requests for information should be directed to James Barker Smith, Wentworth-by-the-Sea, Portsmouth, N. H.

Birmingham's Search for Industry Has New Leaders

Direction of an expanded search during 1953 for new industry and business enterprise in the Birmingham area has been taken over by Frank E. Spain, immediate past president of Rotary International and new president of the Birmingham Chamber of Commerce, and by Edward L. Norton, chairman of Birmingham's Committee of 100. This committee consists of 100 leading business and industrial executives and has attracted 56 new plants and industries to the area since its organization early in 1950.

Mr. Spain, an attorney in Birmingham for 40 years, succeeds William P. Engel, real estate executive who served as chamber of commerce president during 1951 and 1952. Mr. Norton, president of the Coosa River Newsprint Co. and chairman of the board of Television Corporation, takes over from Clarence B. Hanson Jr., publisher of the Birmingham *News*, a vice president of Associated Press, and first chairman of the Committee of 100.

telling the story of 'dag' dispersions



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...Prevent sticking? A **'dag'** colloidal graphite mold wash prevents sticking because it forms a micronically thin, exceptionally slippery *dry lubricating film.* It speeds parting and assures smooth castings.

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... Work without smoking? Water dispersions of **'dag'** colloidal products improve shop conditions by eliminating irritating smoke caused by most parting compounds.

And if you want to avoid chilling, use a **'dag'** refractory mold wash.

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Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

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try 'dag' resin-bonded dry films for permanent lubrication

Plant Visitation Schedule at AFS Convention

PLANT	FEATURES	AVAILABILITY
ACCURATE MATCH PLATE CO., Chicago	Manufacture cope and drag sets	May 6, 7, 8 10 a.m. and 2 p.m.
ACCURATE METAL LABORATORIES, Chicago	Chemical and spectrographic laboratories analyzing metals	May 4, 5, 6, 7, 8, Any time
ALLIED STEEL CASTINGS CO., Harvey, Ill.	Open hearth steel castings	Not announced
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO. Chicago Heights, Ill.	Electrically melted manganese steel and heat and acid resisting steel castings	May 5 1 p.m.
AMERICAN STEEL FOUNDRIES, INDIANA HARBOR WORKS, East Chicago, Ind.	Basic and acid electric furnaces. Railroad castings; research laboratory	May 7 2 p.m.
ARMOUR RESEARCH FOUNDATION INSTITUTE, Chicago	Industrial research projects and scientific investigations for industrial and governmental clients	May 6. 9:30 and 11 a.m. 1:30 and 4 p.m.
ARROW PATTERN & FOUNDRY CO., Chicago		May 4, 5, 6, 7, 8, Any time
BURNSIDE STEEL FOUNDRY CO., Chicago	Electric steel castings. Heat treating plant	May 6, 7, 8. 1 p.m.
CHICAGO HARDWARE FOUNDRY CO., North Chicago, Ill.	Gray iron, brass and aluminum castings, mechanized and floor work. Wet and dry porcelain enameling and electroplating	May 5, 6
CHICAGO MALLEABLE CASTINGS CO. Chicago	Duplex malleable iron. All types of castings	May 6, 7. 10 a.m.
CHICAGO STEEL FOUNDRY CO., Chicago	Two acid electric arc furnaces. Mechanized. Carbon and alloy steels including heat and acid resisting castings	Not announced
L. A. COHN & BROTHER INC., Cicero, Ill.	Copper-base alloy ingot	May 6
ELESCO SMELTING CORP., Chicago	Copper-base alloy ingot	May 6
FEDERATED METALS DIVISION, AMERICAN SMELTING & REFINING CO., Whiting, Ill.	Copper base alloy ingots, lead, tin, zinc alloys, solder and babbitt	May 6. Busses leave Hotel Sherman at 10 a.m.
FERGUSON & LANGE FOUNDRIES INC.	General jobbing gray iron, 30 tons per day. Slinger, floor and bench molding. Machine tool and miscellaneous castings	May 7. 1 to 3 p.m.
FORD MOTOR CO., AIRCRAFT ENGINE DIVISION, Chicago	Highly mechanized foundry, producing magnesium airplane castings for reciprocating and jet engines. All molding done in dry sand	May 4, 5. 9 a.m., 1 p.m.
GRIFFIN WHEEL CO., Chicago	Chilled railroad car wheels	May 6. 9 to 11 a.m.
HANSELL-ELCOCK CO., Chicago	Heavy work such as machine tool, Diesel engine and machinery castings. Slinger and rollover work; up to 70 tons daily	May 5, 7. 9:30 to 12 a.m.
HARBISON WALKER REFRACTORIES CO. East Chicago, Ind.	Manufacture silica refractories	May 4, 5, 6, 7, 8
BENJAMIN HARRIS & CO. Chicago Heights, Ill.	Copper base alloy ingot	May 6. Busses leave Hotel Sherman at 10 a.m.
ILLINOIS CLAY PRODUCTS CO., Joliet, Ill.	Manufacture refractories and foundry clays	May 5, 6
ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago	Instruction facilities and laboratories for engineering and scientific courses	May 4, 5, 6, 7, 8 9 a.m. to 5 p.m.
ILLINOIS MALLEABLE IRON CO., Chicago	Duplex malleable iron. All types of castings	May 6. 10:30 a.m. and 2:30 p.m.
INTERNATIONAL HARVESTER CO., MALLEABLE IRON FOUNDRY, McCORMICK WORKS, Chicago	Batch and duplex melting. Small agricultural implement and heavy automotive castings	May 7 1:30 p.m.
INTERNATIONAL HARVESTER CO., TRACTOR WORKS, Chicago	Make sleeves, heads, cylinders and miscellaneous parts for industrial power application. Machine shop and induction hardening equipment	May 8 9 a.m.
INTERNATIONAL MOLDING MACHINE CO. LaGrange Park, Ill.	Manufacture molding machines	May 4, 5, 6, 7, 8 8 a.m. to 5 p.m.
CHARLES G. KAWIN CO., Chicago	Analytical chemists and metallurgists	May 4, 5, 6, 7, 8 Afternoon only
H. KRAMER & CO., Chicago	Copper base alloy ingot	May 6
R. LAVIN & SONS INC., Chicago	Copper and aluminum base alloy ingot	May 6
LINDBERG ENGINEERING CO., Chicago	Manufacture heat treating furnaces and equipment	May 7. 2 p.m.
LINK-BELT CO., Chicago	Gray iron and converter steel, melting about 40 tons of each daily. Heavy machinery and power shovel castings	May 4, 5, 6, 7, 8 10 a.m. and 2 p.m.
LOVE BROTHERS, Aurora, Ill.	Heavy general machinery; jobbing work	May 6, 7. 2 p.m.
NATIONAL MALLEABLE & STEEL CASTINGS CO., Cicero, Ill.	Duplex malleable and electric steel castings. Highly mechanized. All types of work	May 4, 5, 6, 7, 8 1:30 p.m.
NICHOL STRAIGHT FOUNDRY CO., Chicago	Jobbing machinery castings, squeezer, rollover and floor molding. About 15 tons daily	May 4, 5, 6, 7, 8, 9:30 a.m.
PETTIBONE-MULLIKEN CORP., Chicago	Acid and basic arc furnaces. Hadfield manganese steel castings	May 6, 7, 8 10 a.m.
THOR CORP., Chicago	Washing machine and home appliance castings. Mechanized, continuous pouring. About 30 tons daily	May 5, 6, 7 9 a.m.
UNIVERSITY OF ILLINOIS, Chicago Branch	Instruction facilities and laboratories	May 4, 6. 1 p.m.
WESTERN ELECTRIC CO., Chicago	Melt 25 tons of gray iron plus aluminum and brass. Light gray iron castings for electrical and telephone industries. Mechanized	May 5, 7 2 p.m.
WESTERN METAL CO., Chicago	Copper and aluminum base alloy ingot	May 6

Simplest Efficiency-Booster you ever saw!

Typical installation of Foxboro Air Weight Control . . . readily adaptable to either a centrifugal blower (shown in diagram) or a positive displacement blower.

Controlling cupola blast by **weight of air** cuts pigging, ups quality, gives uniform pours

There's no longer any need to let the weather upset your cupola operation. With a Foxboro Air Weight Controller you can get uniform pours, *every day.*

The Foxboro Air Weight Controller automatically and precisely controls cupola air blast by weight — delivers the correct amount of oxygen for the quantity of coke in the charge. Regardless of ups and downs in atmospheric pressure or temperature, this simple, inexpensive accessory compensates for every change—insures better combustion, more uniform heats, and saves pigging.

All you do is set the control pointer before you start the run. No further attention is necessary. Air weight is held constant as long as desired, or may be changed instantly for pours of different composition. Installation on your present blowers easily made by an experienced pipefitter.

Foxboro Air Weight Controllers are used by more than 1000 foundries. Write for Application Engineering Data Sheet 330-6, and Bulletin 268-3. **The Foxboro Company, 325 Neponset Ave., Foxboro, Mass., U.S.A.**

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FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

Fine Patterns
at moderate prices
..... SINCE 1897

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That's why Cleveland Standard Pattern Works, Inc., still guided by the president and founder, Mr. C. Birnbaum, has grown with industry over the past 55 years.

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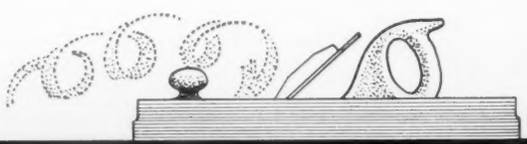
Secretary-Treasurer

Many changes have taken place since Mr. Birnbaum first opened shop back in 1897, but the same policy of producing accurate patterns at reasonable prices remains. Naturally, capacity has been increased many, many times since those early days when Mr. Birnbaum produced patterns for L. Chevrolet, T. White, A. Winton, Frank Horsburgh, the Aluminum Co. of America, Chicago Pneumatic Tool, Van Dorn Electric Co., etc., etc. No pattern was ever too large, too small or too intricate. Every job was accepted as a challenge to his ingenuity and craftsmanship. To his 55 years of experience, add Mr. Winkler's 39 years and Mr. Roth's 24 years, and you get a management group with 118 years of practical skill calculated to meet any pattern making problem. Whether you use the smallest metal patterns or the largest wooden patterns, we are ready to put our experience and equipment at your disposal. It costs nothing for consultation. You'll be pleased with our cooperation and final results.



Cleveland STANDARD PATTERN WORKS, Inc.
5337 ST. CLAIR AVENUE CLEVELAND 3, OHIO

Who Uses Strainer Cores and How Many?

AN ESTIMATED 243,500,000 strainer cores are used annually by the 3400 larger foundries of the United States and Canada, according to the results of a study by FOUNDRY. Of the total cores used, 73 per cent are sand cores, 17 per cent are ceramic type and 10 per cent are metal screen.

FOUNDRY queried 1053 foundry superintendents in all classes of foundries employing 20 or more workers. A total of 235, or 22 per cent, replied. The percentage of reply was uniform from foundries in each of these three groups: Those with 250 or more employees, those with 50 to 249, and those with 20 to 49.

Of the 235 foundries which replied, 54 per cent (131) use strainer cores, and 46 per cent (104) do not. Table I shows the breakdown of reply percentages by foundry size. Rather than assume that 54 per cent of all foundries use strainer cores, (since nonusers are more likely not to return questionnaires than users) it was assumed no reply is equivalent to 75 per cent negative or "do not use" and 25 per cent affirmative or "do use." On this basis it is estimated that 31 per cent of the foundries employing 20 or more persons use strainer cores.

Asked, "In connection with casting what metals do you use strainer cores?" gray iron foundries indicated that they use all three kinds, and in percentages similar to those for the industry as a whole. Answers to the same question by malleable foundries show that they use either sand or ceramic strainer cores. Steel foundries do not generally use strainer cores, although a few do. Brass and bronze foundries use both sand and ceramic, and aluminum and magnesium foundries reported they use metal screen exclusively. Table II shows types of strainer cores used by size of foundry.

Replies to a question concerning the sizes and shapes of strainer cores used indicate the round ones are used most frequently. Average diameter seems to be about 2 to 2½ in., with a range from 1 3/16 to 8 in. reported.

TABLE I—PERCENTAGE OF USERS

	Yes	No
Group I—Foundries employing 250 or more..	57%	43%
Group II—Foundries employing 50 to 249	61	39
Group III—Foundries employing 20 to 49	45	55
Weighted average	54%	46%

TABLE II—TYPES OF CORES USED

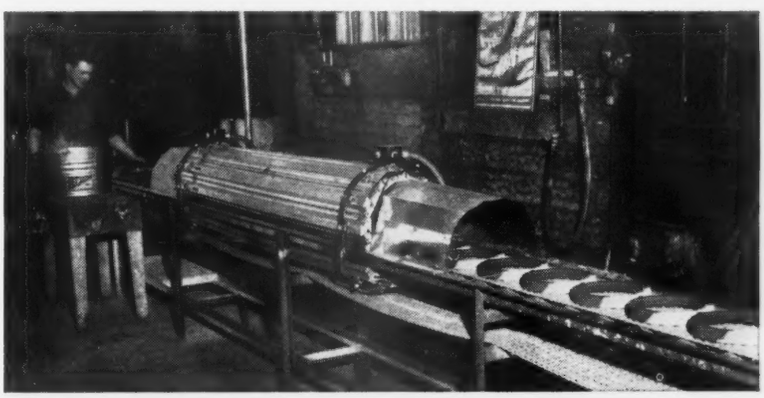
	Sand	Ceramic	Metal Screen
Group I—Foundries employing 250 or more	71%	21%	8%
Group II—Foundries employing 50 to 249..	74	16	10
Group III—Foundries employing 20 to 49...	71	17	12
Weighted average	73%	17%	10%

TABLE III—AVERAGE FOUNDRY CONSUMPTION

Group I—Foundries employing 250 or more...	approx. 2,500 daily
Group II—Foundries employing 50 to 249	approx. 1,000 daily
Group III—Foundries employing 20 to 49	approx. 150 daily
Weighted average	925 daily

Another CHROMALOX Production Tip

Core Drying Time Cut from 24 HOURS to 6 SECONDS!



PROBLEM

To speed up the drying of the dip-coat applied to cores for casting automotive parts. At least 24 hours drying time was needed under old method, and 6000 square feet of valuable floor area was used to store the cores while they air dried.

SOLUTION

The foundry installed a compact far-infrared core drying oven made of eleven 3.6 kilowatt all-metal Chromalox Electric Radiant Heaters. A 15-foot conveyor belt, variable in speed from zero to 10 feet-per-minute, moves cores through the oven at rate of 600 to 800 per hour. Cores are thoroughly dry in 6 seconds and ready for assembly.

ADVANTAGES

1—Drying time reduced from 24 hours to 6 seconds! 2—Existing core drying area including oven occupies only 200 square feet against 6000 square feet the old way. 3—Core surfaces are smooth and bubble-free with rejects practically eliminated.

CHROMALOX
Electric Heat for Modern Foundries

Want to know more about cutting costs with CHROMALOX heat?

EDWIN L. WIEGAND COMPANY SB-32
7596 Thomas Blvd., Pittsburgh 8, Pa.
Send me more details on Chromalox Electric Heat for

☐ Shell molding ☐ Core drying
☐ Skin drying of molds ☐ Comfort heating

Name
Company
Street
City Zone
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"Certified" Abrasives

clean more castings per dollar!

"Certified" Samson Shot and Angular Grit are made *extra-tough* by a special *automatically controlled* hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

Experienced Foundrymen say:

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

MEMBER FEMA

Irregular shapes are used most often by larger foundries.

The number of strainer cores used per one-shift day varies greatly, even among foundries of the same size and class. The dimensions and types of castings produced govern whether or not strainer cores are used at all. Large production foundries with quantity runs naturally are the biggest users; two foundries reported using over 12,000 strainer cores per one-shift day. On the other hand, jobbing foundries, with shorter runs, tend to use fewer strainer cores.

Table III shows the estimated number of strainer cores per foundry per one-shift day. Weighted average core use for all types of foundries employing 20 or more men is 925 daily.

Estimated total consumption of strainer cores by foundries employing over 20 employees is arrived at on the basis of average consumption as shown in Table III and the indication that the cores are used by 31 per cent of the foundries. This gives an aggregate of 243,500,000 cores used annually, based on 240 working days a year, one shift. This total is comprised of 177,755,000 sand cores, 41,395,000 ceramic cores and the balance metal screen.

OBITUARY

HAROLD C. OSMAN, 61, vice president-sales manager, Crucible Steel Casting Co., Lansdowne, Pa., died Mar. 17. Mr. Osman joined the company in 1944. Previous connections include Nugent Steel Casting Co., Chicago, and Reading Steel Casting Co., Division of American Chain & Cable Co., Reading, Pa.

* * *

James R. Webster, former president, H. E. Mills Mfg. Co., Cleveland, manufacturer of core compounds and binders, died Feb. 11 in Burbank, Calif. Mr. Webster was associated with the company from 1907, when it was incorporated, until 1949 when he retired and moved to California. He pioneered in the introduction of pitch core binders in the foundry industry.

* * *

Frank Turow, 70, executive vice president, Craft Chemical & Mfg. Co., Milwaukee, foundry supplies, died Mar. 11. Mr. Turow helped organize the company 6 years ago.

* * *

George T. Johnson, 77, retired president-general manager, Buckeye

(*Concluded on page* 308)

A ZIG-ZAG Conveyor in the core department of a large foundry. Baked cores are transferred direct from ovens to conveyor carriers. While cooling, cores move via upper elevation to checking and ganging benches. This installation, over 500 feet overall and constructed entirely of stock sections, is powered by two synchronized drive units.

with R-W "Zig-Zag"® Continuous Power Conveyor

For safely moving fragile cores and castings in aluminum and brass foundries, you can't beat a ZIG-ZAG continuous Power Conveyor with its smooth, jerk-free flow at speeds from 1 inch to 60 ft. per minute.

ZIG-ZAG operates just like "water through a pipe"—it's a steel tube-like track and specially constructed motor-driven chain carrying unit loads up to 125 pounds each. And it's highly flexible, too—for changes or relocation, take it down here and put it up there, and in most cases *use all of the parts.*

AND THERE'S R-W EQUIPMENT FOR HEAVIER JOBS, TOO

TRU-TRED Monorail Track and Ball Bearing Trolley Systems. For manual or high-speed electrical handling of loads from 500 pounds to 4 tons. Wide choice of TRU-TRED track sizes with broad range of capacities and spans eliminates need for costly superstructure.

R-W Heavy Duty Cranes. I-beam construction identical with TRU-TRED Track. For use with manual or electrically operated trolleys or hoists.

Write for details—or have an R-W engineer consult with you at no obligation.

Zig-Zag is Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

466 THIRD STREET, AURORA, ILLINOIS

1880 RICHARDS WILCOX R-W AURORA TRADE MARK 1953

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SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS • ELEVATOR DOOR OPERATING EQUIPMENT

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FOR THE BEST
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Item C-681
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CORRUGATED BOX with legs
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SKIP TOTE BOX
Item B-391
MULTI-PURPOSE CART
Item C-608
Item S-915
CORE RACK
For foundry use. Has corner posts designed for adjustability to hold horizontal sections at desired height. Sections notched for 1" pipe extending length of rack to hold core plates. When inquiring specify dimensions required, including undercut clearance and quantity.
Automatic END DUMP
Ideal for handling and dumping of sand, scrap, castings, stampings and other heavy materials. Locks during loading by safety catch. Built for lift or fork truck or with casters. All welded construction. Standard size ½, 1 and 1½ yds. capacity, other sizes on request.
When Ordering—Always give "item" number. All prices are f. o. b. Detroit. Prices are subject to change without notice. Write for Catalog.
Item 50975
AIR SAVER leak proof AIR VALVE
Item B-380
TRAILER TRUCK side dump
Item S-911
BARREL TRUCK loads automatically
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Industrial DUST PAN
DESIGNED AND MANUFACTURED BY
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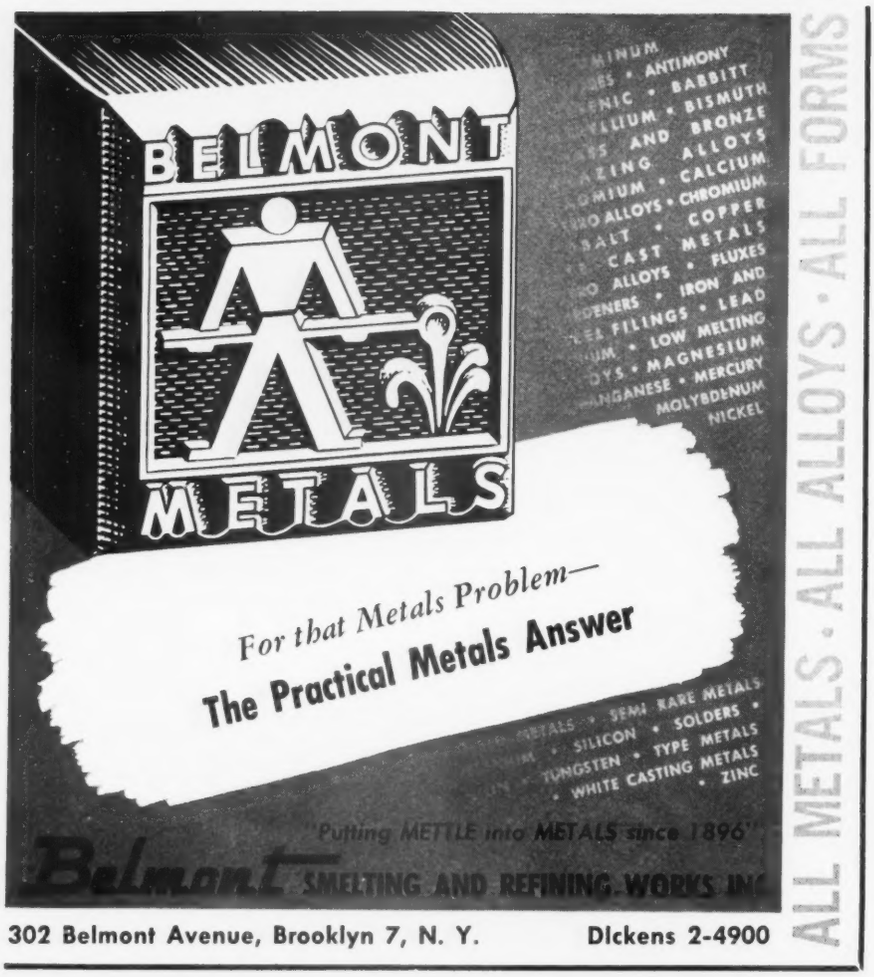


(*Concluded from page* 306)

Steel Castings Co., Columbus, O., died Mar. 11. Mr. Johnson, a company director, was associated with the company 42 years.

* * *

Thomas J. McIntyre, 64, president-general manager, Macklin Co., Jackson, Mich., died Apr. 2. Mr. McIntyre joined the grinding wheel industry as a salesman with the Carborundum Co., in 1909 and 4 years later became associated with Waltham Grinding Wheel Co., Waltham, Mass. He went to Jackson in the early 20's and with his brother organized the Grinding Wheel Clearing House there. In 1927 he helped establish the Macklin Co.

IRVING R. SMITH, president, Sterling Wheelbarrow Co., West Allis, Wis., who died Feb. 26, as reported last month.

J. G. Mingle, 64, superintendent of the division of air pollution control, Indianapolis, died there Mar. 28. Mr. Mingle had been engaged in this field for many years, and was an active member of the Air Pollution Control Association.

* * *

John W. Haynes, 62, founder and president, Haynes Foundry Equipment Co., Kalamazoo, Mich., died Feb. 1, following an illness of several months. Mr. Haynes entered the foundry industry at the age of 16 as a molder apprentice and later became superintendent of various foundries. He went to Kalamazoo in 1935 and established his own foundry supply business.

* * *

Stephen Pesky, 54, president, Empire Brass & Aluminum Foundry Inc., Milwaukee, died Mar. 19.

* * *

Peter J. Murphy, 66, owner, Excel Pattern & Foundry Co., Chicago, died Mar. 23.

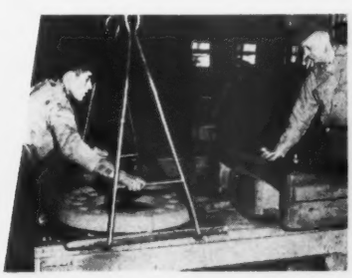
YOU WOULD HAVE TO GO OUT OF THIS WORLD TO BEAT THE QUALITY AT...

OTTAWA

Making a sand core for base casting. Core sand is being packed into core box with impact hammer.

Why? Because Ottawa is endowed by nature with sands that are 99.89% pure by actual laboratory test. They constitute one of the world's finest silica deposits.

Supplying to all forty-eight states—indeed, to many remote corners of the earth—Ottawa Silica Company can point with pride to constant quality in its 53 years of service to the foundry trade.



Finished ink roller core being readied for baking. Uniform sand, bond, grain size, moisture content, etc., are highly desirable.

Sand slinger ramming up a mold with molding sand (silica sand and bond). Machine operates at 1800 revolutions per minute.

Photos made at Lindgren Foundry Company, Inc., Batavia, Illinois, a steady user of Ottawa Silica products.

OTTAWA SILICA COMPANY

PLANTS LOCATED AT OTTAWA, ILL. AND ROCKWOOD, MICH.

Industry Briefs

GENERAL Steel Castings Corp., Granite City, Ill., and C. P. Whitehead, president of the company, have been presented with Granite City's annual civic achievement award for "many years of progressive leadership" in the community. The firm's activities in the construction of a community house and a YMCA building and its aid to the local Community Chest were cited as examples of its interest in the needs of the community.

* * *

United States Pipe & Foundry Co.'s Chattanooga works has been honored as the 1952 winner of the company's interplant safety contest. The award was "in recognition of safe production which yearly distinguishes the winners of the interplant safety contest." The plaque carries an attached plate that shows that the local plant was the 1952 winner with an accident frequency rate of 2.58 per million man-hours worked.

* * *

Precision Castparts Corp., 8705 S. E. 13th Ave., Portland 2, Oreg., has been formed with precision investment casting facilities for production of intricate small parts from ferrous and nonferrous metals. Plant occupies 8000 sq ft of space in a new building. Equipment includes wax injection machines, furnaces, tool and die equipment, grinding and finishing equipment. Castings are used in saw chain and accessory and tool parts, optical equipment, machine parts, etc. Officers of the company are: Joseph B. Cox, president; Edward H. Cooly, general manager; William Simpson, superintendent of plant operations.

* * *

Lindberg Steel Treating Co. is undertaking a $2 million expansion program that will include a new 100,000-sq ft plant now under construction on a six-acre tract at 1975 North Ruby St., Melrose Park, Ill. It will double the company's heat treating capacity, bringing it to more than 50 million pounds annually, and will house about 200 heat treating furnaces, including more than $1 million worth of new equipment.

* * *

Armour Research Foundation of Illinois Institute of Technology plans to move its administrative headquarters into the five-story Arcade Building, 10 West 35th St., Chicago, and into the adjoining Binga Bank Building by midsummer. Much of the available space in the foundation's present main office, at 35 West 33rd St., will be converted into additional laboratories for research.

* * *

Williston & Co., Delta, O., has appointed Klein-Farris Co., 683 Atlantic Ave., Boston 11, and Lacledе-Christy Co., 5 South Wabash Ave., Chicago 3, to be exclusive sales agents for American Clay Forming Co.'s ceramic strainer cores in respectively, Maine, New Hampshire, Vermont, Connecticut, Rhode Island and Massachusetts; and in northwest Illinois and Iowa.

* * *

Smeeth-Harwood Co., located for 60 years at 2401 West Cermak Rd., Chicago, has moved its operations to 8524 South Vincennes Ave., Chicago 20. With more space available, facilities to produce steel mill brass and bronze castings have been added. A specialist in blast furnace copper castings, the company is celebrating its 100th anniversary this year.

* * *

Eutectic Welding Alloys Corp., 40-40 172 St., Flushing, N. Y., has opened new divisional branch offices at 166 West Washington St., Chicago; Brown-Marx Bldg., Birmingham; and 50 East Broad St., Columbus, O. Divisional sales managers are, respectively, Robert H. Groman, Charles Brown and L. D. Richardson.

* * *

Marietta Concrete Corp. of Florida was recently incorporated by Marietta Concrete Corp., Marietta, O. New plant, located in Hollywood, Fla., will distribute farm and industrial silos and other precast concrete products in the southern states. F. L. Christy, president of the parent company, will also be president of the Florida firm.

* * *

New York City domestic sales offices of Abrasive Division, Grinding Machine Division and Refractories Division of Norton Co., Worcester, Mass., have been moved to Green and North St., Teterboro, N. J. The office of Norton Behr-Manning Overseas Inc. will remain at the old address, 61 Broadway, New York 6.

* * *

Bonne Terre Foundry Co., Grove St., Bonne Terre, Mo., has been purchased by K. R. S. Bronze Foundry Co., 2412 South Fourth St., St. Louis 4. Operations of both foundries will be consolidated in Bonne Terre where considerable expansion of present facilities will be made.

* * *

Industrial Equipment Co., 315 N. Ada St., Chicago 7, manufacturer of cranes and monorail systems, has changed its name to Industrial Crane & Hoist Corp.

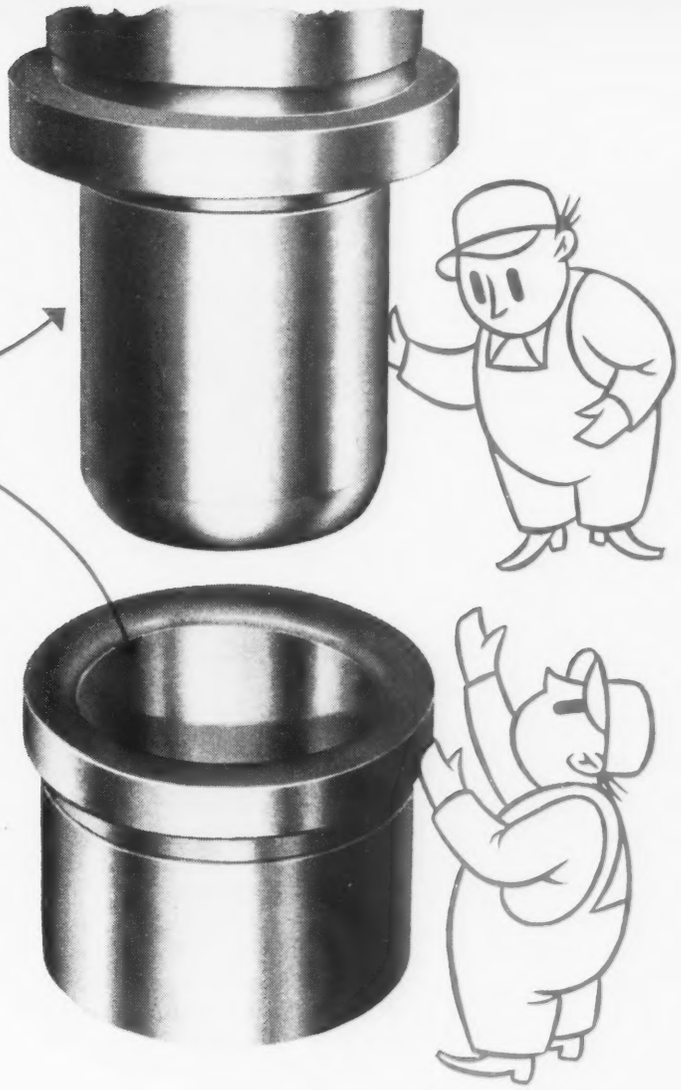
* * *

Round Chain Companies, Broadway & Chaincraft Rd., Cleveland 5, a group of 11 affiliated companies throughout the United States, has

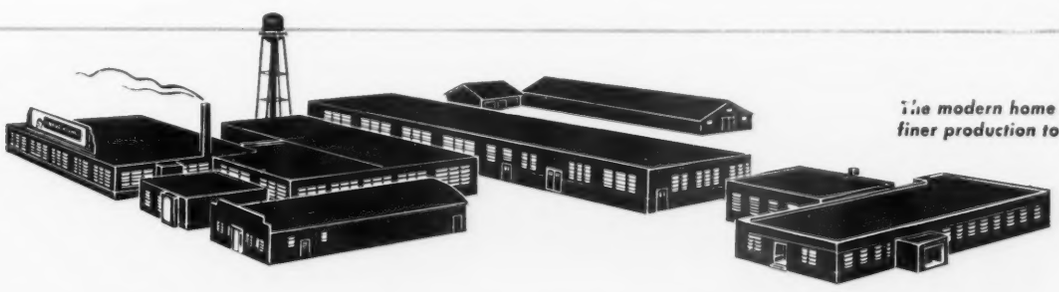
(*Concluded on page* 312)

WEST COAST SMELTING PLANT: Apex Smelting Co., Chicago, is celebrating its 30th anniversary with the opening of $1 million smelting plant at 2211 East Carson St., Long Beach 10, Calif. The new plant provides a West coast source of alloys and a local facility for smelting scrap aluminum and magnesium generated in southern California plants. Consisting of a 54,000-sq-ft production building and laboratory with an additional administration and office building, the new Apex installation is situated on a 20-acre site

carburized and hardened steel wearing surfaces and ductile cores mean long life for UNIVERSAL flask pins and bushings



It's no easy trick to produce flask pins and bushings that are hard enough to take long, rigorous wear, and yet have cores ductile enough to resist breakage and rough treatment in the foundry. However, Universal has accomplished this difficult task. Universal flask bushings are double quenched and double drawn to produce a fine grain structure that will withstand considerable stress and strain without breaking or chipping. The wearing surfaces are carburized and hardened to reduce wear and prolong the life of both pin and bushing. Universal flask pins and bushings are precision ground to extremely close tolerances to insure instant, accurate alignment of cope and drag. Plain, taper and threaded series pins and bushings are available in a complete range of sizes as regular stock items. For complete information about Universal flask pins and bushings, write to the office nearest you — Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis. — or the home office.



The modern home of finer production tools

172

UNIVERSAL ENGINEERING COMPANY **FRANKENMUTH 4, MICHIGAN**

(*Concluded from page* 310)

established a Canadian affiliate, Round Chain Co. of Canada, 12,000-sq ft facilities for which are located in Brampton, Ont., 27 miles west of Toronto.

* * *

Black & Decker Mfg. Co., Towson 4, Md., portable electric tool manufacturer, will build immediately a 126,000-sq ft addition to its 110,000-sq ft Hampstead, Md., plant, which went into operation in April, 1952. Construction is scheduled to be completed in November, although partial operation in the addition is planned for September.

* * *

Thor Power Tool Co., Aurora, Ill., recently opened an export sales and service office at Basilio Badillo 47, Mexico, D. F., Mexico. New company, known as Thor Tools of Mexico Inc., will be under direction of C. L. Rowett.

* * *

Pekay Machine & Engineering Co., 101 LaSalle St., Chicago, suffered an interruption in production at its Sangamon St. plant on Feb. 28 when the plant adjoining it caught fire and water from the fire hoses covered a large part of Pekay's machine shop and offices to a depth of several feet. Partial production was resumed in a few days and full production in several weeks.

* * *

Foundry Specialties Inc., Euclid, O., has been incorporated by Evelyn J. Miller, George X. Mechir and Richard L. McNelly. Mr. Mechir, 800 Fidelity Bldg., Cleveland, also is listed as statutory agent. Burnett Non-Ferrous Foundry Inc., Cleveland, also has been incorporated by the same people.

* * *

Lewis-Shepard, Watertown, Mass., has appointed Francis E. Honsa its exclusive representative in the southern Connecticut area. With the company for seven years as a design engineer, Mr. Honsa is responsible for the basic design of several of the company's new materials handling power trucks.

* * *

Lindberg Engineering Co., Chicago, Ill., opened its new West coast plant, at 11937 South Regentview Ave., Downey, Calif., on Mar. 25. Comprising 12,000 sq ft of production and office space, the factory will manufacture industrial heat treating furnaces and other company products.

* * *

Radioactive Products Inc., 443 West Congress, Detroit 26, is offering encapsulation services on radioactive sources. In addition to other types of radioactivity, it now is handling cobalt 60 sources for industrial radiography of castings and weldments.

* * *

Surface Combustion Corp., Toledo 1, O., has named Economy Equipment Co., 4526 Olive, St. Louis, as agents for the sale of their standard industrial equipment in the states of Missouri and Kansas and in the southern half of Illinois.

* * *

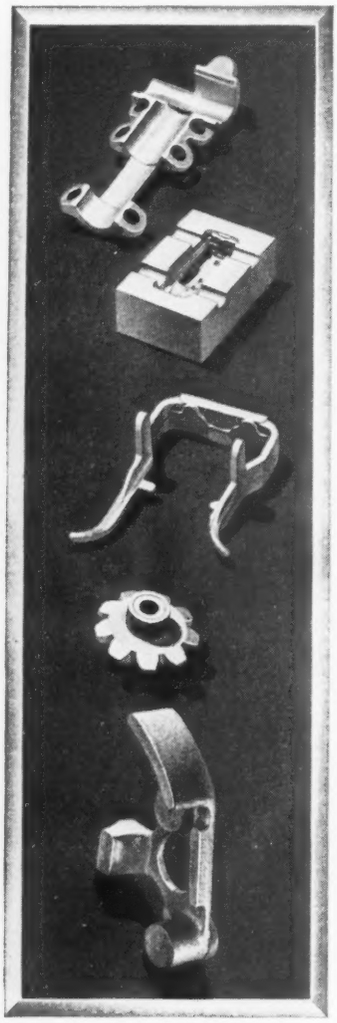
Moskowitz Brothers, Budd and Harriet Sts., Cincinnati, scrap dealers, have installed a new plant for the production of brass and bronze ingot and lead alloys.

* * *

Farrell-Cheek Steel Co., Sandusky, O., has completed an expansion of its steel casting facilities to handle production of castings up to 2000 pounds.

* * *

Magnaflux Corp. has moved plant and general offices from 5900 North Northwest Highway, Chicago, to 7300 West Lawrence Ave., Chicago 31.



Various sand-cast Berylco beryllium copper parts. For complete information on alloys available, write for your free copy of the recently published Product Directory.

WHY BERYLCO BERYLLIUM COPPER IS IDEAL FOR SAND CASTING

Production men say the thing they like about Berylco is its excellent castability. Here's the metal for maximum "as cast" detail.

The low pouring temperature of beryllium copper (nearly 1000 degrees less than steel) greatly simplifies foundry procedure—makes it easier to handle, too. Foundrymen pouring bronzes can readily take on Berylco casting alloys. Molding and gating techniques follow manganese or silicon bronze practice. The intricate detail which Berylco makes possible not only gives the designer greater freedom, but substantially reduces the necessity for machining.

Where required, high-strength Berylco alloys can be readily machined when soft, then hardened by a simple low-temperature heat treatment. High conductivity alloys can be easily machined in the fully heat-treated condition.

The heat-treatable feature of Berylco offers a combination of high final properties not otherwise obtainable. Age-hardened Berylco castings deliver tensile strengths up to 180,000 psi, hardnesses to 450 Brinell, or conductivity as high as 50 percent, depending upon the alloy selected. These are some of the reasons why Berylco beryllium copper is being used more and more in heavy electrical, electronics, resistance welding, machine tool and other mechanical applications.

Plan now to increase your range of alloys with versatile Berylco beryllium copper. Berylco is available in 5 lb., 2½ lb. and 3 oz. ingots. Send for your trial order today.

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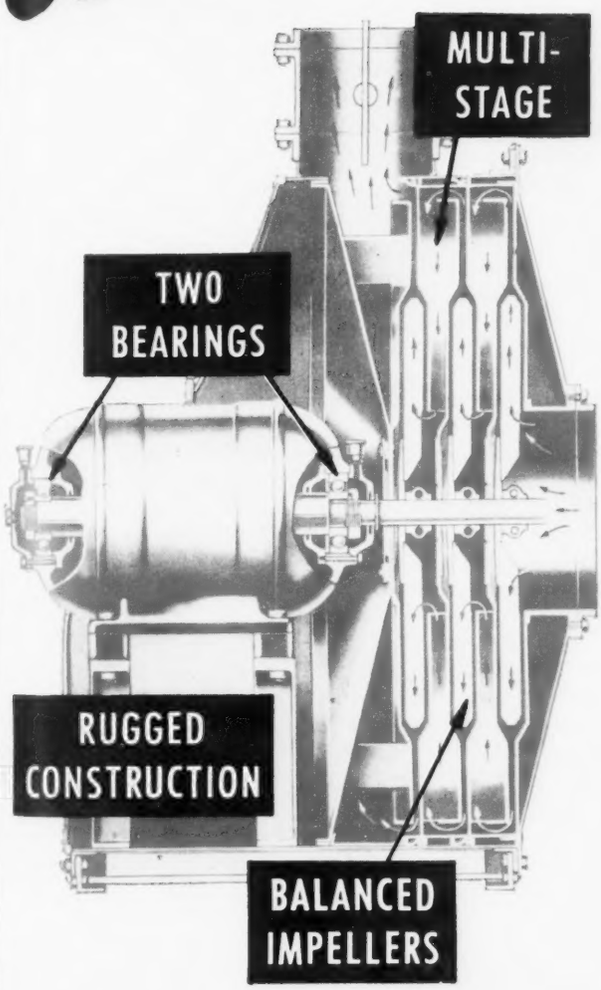
Assured 4 Ways

WITH SPENCER TURBO-COMPRESSORS



There are good reasons why the annual installation of Spencer Turbos has increased tenfold in ten years and why a recent analysis shows that repair parts amount to less than one dollar per machine per year.

No. 1. The Spencer multi-stage construction allows a smaller diameter machine with lower peripheral speeds of the fan blades and of the motor itself. The wear on the bearings is therefore cut to a minimum.

No. 2. The only rotating contacts are at the two ball bearings, which if kept greased will assure satisfactory operation without work stoppages for many years.

No. 3. Here is a machine as simple as an electric fan, with a rugged construction, as sturdy as a steel bridge and with wide clearances between the rotating elements and stationary parts. Users say "the Spencer goes on forever with little attention."

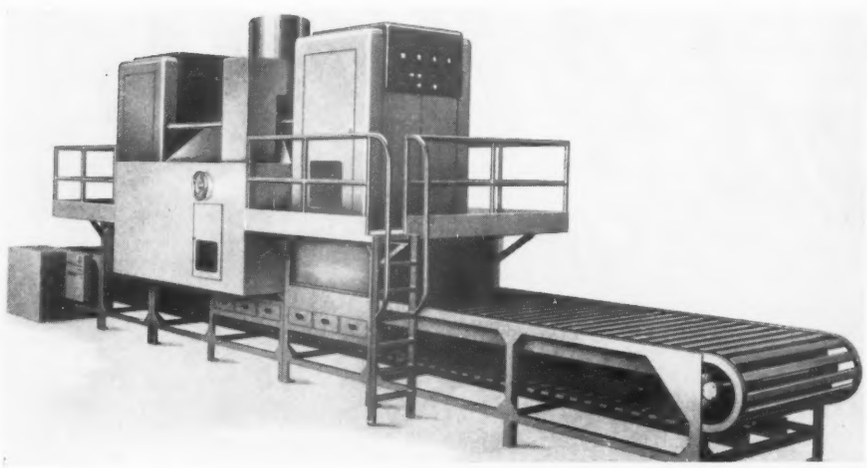
No. 4. Balanced Impellers. Each fan is individually balanced before the machine is assembled. This decreases the vibration, increases the life of the bear ings and packing and produces quiet performance.

35 TO 20,000 C.F.M.; 4 OZ. TO 10 LBS.; 1/3 TO 1,000 H.P. 440-H

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER
HARTFORD

New EQUIPMENT and



Dielectric Core Drier: Allis-Chalmers Mfg. Co., General Machinery Division, Milwaukee 1—Dielectric core drier is designed to handle cores on metal plates, as well as some in metal driers. Ordinarily, resin-bonded cores dried on metal plates in a dielectric core drier contain wet or uncured sections, but such cores can be dielectrically cured if the metal plates are heated to predetermined temperatures. This drier employs a variable speed metal belt conveyor to carry cores on metal plates or in metal driers through an 18 x 60-in. tunnel opening and over a series of radiant heating elements to heat the plates or driers before the dielectric drying of cores begins. The oven unit, on which the 60-kw output dielectric heater is mounted to conserve floor space, is 9 x 40 ft, including the conveyor, and can dry cores up to 800 lb. Cores pass through 40 sq ft of drying area. Drier is rated at 3000 lb of cores per hour at 3 per cent moisture.

For More Details Circle No. 1—Page 319

Batching Scale: Hydroway Scales Inc., 20624 West Eight Mile Rd., Detroit 19—Batching scale for measuring pouroff of medium and large quantities of liquids in metal casting and other industries has a reverse reading dial. When a full container is lifted and the pointer takes position, the operator turns the adjustment control to reset the dial so that "0" coincides with the pointer. As the contents are poured off, the pointer retreats, registering directly, in 1-lb gradations, the amount of the decreased weight. No subtraction or computation is necessary. The dial can be reset to "0" for full 360 degrees. Scales are inserted between ladle and crane hook and are available at present in 500 and 1000-lb models with 12-in. dials. A stand for holding the scale when it is not in use also is available.

For More Details Circle No. 2—Page 319

Ladle Stopper: Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2—Ladle stopper is said not to crack from heat shock and to offer almost absolute control over pouring of molten steel. It is made of fire clay, graphite and a special synthetic ingredient. According to the manufacturer, it suffers only slight change in contour because of erosion by molten steel.

For More Details Circle No. 3—Page 319

Molding Machine: International Molding Machine Co., LaGrange Park, Ill.—Air rollover, air draw molding machine is designed especially for jobs that are difficult to draw. Said to offer exceptional accuracy of draw, it features air-actuated clamps for clamping either corebox or pattern plate to machine frame, air clamps for clamping core plates or bottom boards, air-operated equalizers, air vibrators and dual control valves.

For More Details Circle No. 4—Page 319

Blasting Machine: R. W. Renton & Co., 836 Addison Rd., Cleveland 3—Company has redesigned its liquid abrasive blasting machine for cleaning, finishing, burring, blending or etching castings, dies and other parts. Said to be effective in the removal of rust, sand, scale and other deposits, it produces a clean matte surface to which electroplated metals, paints and other substances are reported to adhere readily. The machine can effect any finish desired on any flat or irregular surface, does not damage sharp edges and can hold metal removal to 0.0001 in. Liquid slurry is drawn up by siphon injection and propelled from the blasting nozzle by a high-velocity air stream. Only moving part within the cabinet is the blower used to ventilate it.

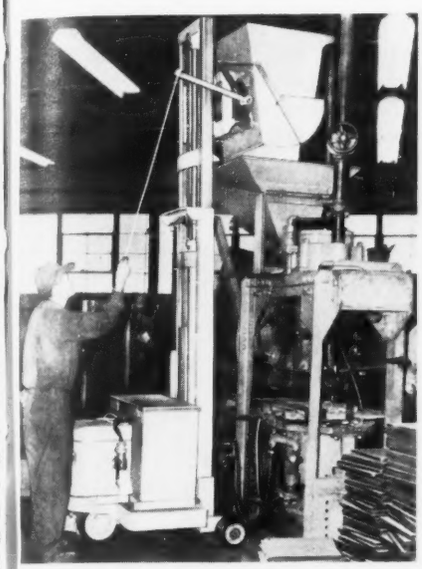
Unit is designed to handle abrasives ranging from 60 to 5000 standard screen size, and new design is claimed to permit fast changeovers.

For More Details Circle No. 5—Page 319

Foundry Truck: Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14—Lift truck available at low initial cost is designed especially to move sand between foundry machines and to operate in limited areaways. Capacity is 1000 lb, total lift 120 in. Truck is powered by a 12-v battery with two motors, one for the lifting mechanism, the other for the drive wheels. All controls, including those

SUPPLIES

For More Details on these Items
Use Reply Card—Page 319



for lifting and lowering the hopper, are located within the steering handle.

For More Details Circle No. 6—Page 319

Profile Template: Toolcraft Mfg. Co., 6619 South Dorchester Ave., Chicago 37—Profile template is said to facilitate obtaining either a male or a female profile of any kind, of any item, including castings, patterns and molds, in seconds. It is composed of fine strips of hard brass, 0.007 in. thick and 0.07 in. wide. The laminations are held in position by two specially constructed clamps secured by two thumb screws and springs, by the tension of which the laminations are held. They adapt themselves to the shape of whatever medium the instrument is pressed against, with reportedly micrometer accuracy.

For More Details Circle No. 7—Page 319

Polishing Lathe: Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo, Mich. — A 10-hp model variable speed polishing and buffing lathe with a speed range of 1500 to 3000 rpm has been added to the company's line. Speed is changed instantly, while the lathe is still running, by turning the dial control.

For More Details Circle No. 8—Page 319

Spectroscopic Electrodes: National Carbon Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17—Company offers preformed spectroscopic electrodes in packages said to assure the manufactured purity of the electrodes until the package is opened. Eleven preformed shapes reportedly meet the needs of spectroscopists and provide a range of sizes and shapes to satisfy widely accepted techniques. Applications include volatilization of medium and large quantities of samples; general quantitative

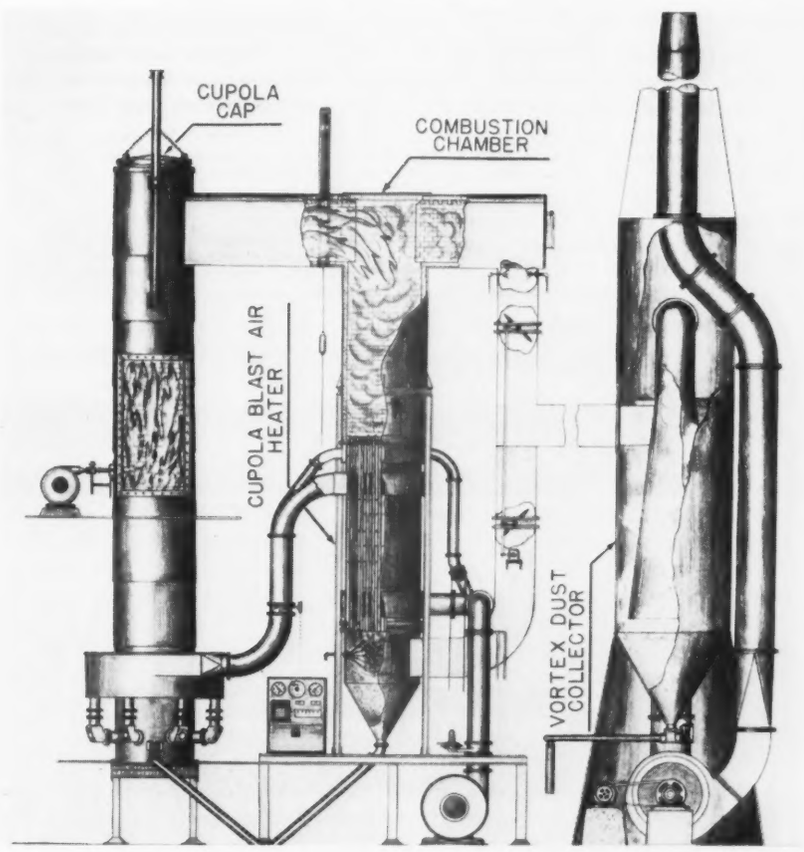
Cupola Combines Hot Blast and Gas Cleaning

COMBINED cupola hot blast, stack gas cleaning system uses waste gas from cupola to provide heat to heat exchanger for transfer into usable heat for the cupola blast air at 800° F. Cupolas are completely capped, and about 90 per cent of the dust and all of the carbon monoxide gas are prevented from escaping to the atmosphere.

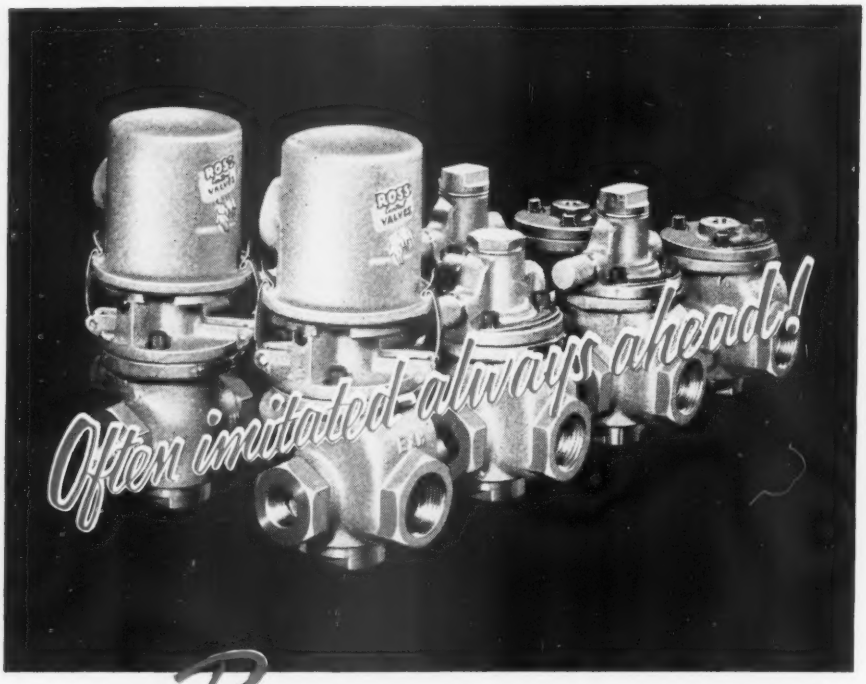
Manufacturer claims that use of the new equipment promotes savings in coke and limestone and reduces metal, silicon and manganese loss and refractory cost. It also is reported to increase cupola melting capacity 20 to 30 per cent, produce hotter metal, and reduce sulphur absorption and bridging at the tuyeres. It is claimed that all cupola gas is harnessed and the usable heat extracted. Gas passes through combustion and dust recovery equipment, where the dust collected is discharged wet or dry, as preferred.

The hot blast heat exchanger is constructed with a single vertical downward pass to assure dropping out the bulk of cinders and dust from waste cupola gas. When it is used in conjunction with the firm's vortex collecting unit, smoke emissions are reduced to less than No. 1, or 20 per cent on the Ringlemann chart. This equipment is manufactured by Grindle Corp., 16231 Turner Ave., Markham, Ill.

For More Details Circle No. 9—Page 319



IF IT'S A VALVE FOR FOUNDRY WORK— ROSS HAS IT



Ross In-line Valves

The reputation and performance of Ross In-line Series Valves are so outstanding that imitations are constantly being attempted. Through constant improvements, the Ross In-line Series remains the leader and the envy of the trade. Here's why—

- *Dependable*—10 to 20 million maintenance-free cycles, and many more tens of millions of life-cycles, are not uncommon.
- *Speedy*—split second operation; oversized exhaust.
- *Low current consumption for solenoid models*—inrush of 1.2 amps @ 110/60.
- *Positive seal*—poppet construction; Hycar seats.
- *Easy maintenance*—only a few moving parts; can be disassembled without breaking line connections — solenoids readily accessible.
- *Many modifications*—vacuum, air, and liquid service; various pressures; available for AC or DC solenoids or air actuation with or without sequence timing; interchangeable heads.

Write for full information on the Ross In-line Series

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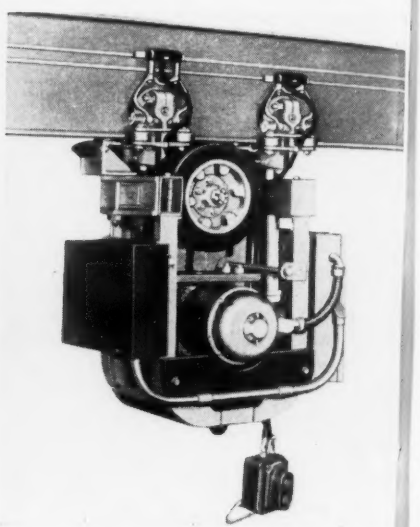
and qualitative work when complete volatilization of sample is required; general solution analysis involving relatively large samples; analysis of samples of high, medium and low boiling points and porous cup analysis of solutions.

For More Details Circle No. 10—Page 319

Monorail Drive Unit: American Monorail Co., 13104 Athens Ave., Cleveland 7—Monorail drive unit offers wide variation of control motor applications including fluid drive, adjustable spring-loaded drive suspension, easily replaceable heavy duty



4 x 12-in. rubber drive wheel and compact fabricated frame construction. Manufacturer says that it will propel 5-ton loads under heavy-duty cycle requirements. It can be applied for propulsion of electric hoist or other type carriers on monorail track with a smooth bottom flange

For More Details Circle No. 11—Page 319

Lens Cleaner: Carol Chemical Products Corp., 368 East 45th St., Brooklyn 3 N. Y.—Antifog and lens cleaning cloth for use on glass or plastic surfaces prevents formation of fog or steam on eye glasses, windshields, windows, mirrors and similar objects. Wiping a surface with the impregnated cloth cleans and fog proofs it in one operation. No other equipment is necessary. The cloth comes packed in an individual plastic bag that can be carried in a pocket

For More Details Circle No. 12—Page 319

Band Saw Welder: Brenner Mfg. Co., 676 59th St., Brooklyn 2 N. Y. — Portable band saw blade welder for butt welding all blades from 1/16 to ¾ in. permits a wide range of work from intricate internal tool and die to power cutoff saw. Built into the machine are a grinder for removing flash from welds and

(*Continued on page* 321)

HELPFUL IDEAS FOR FOUNDRYMEN

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "Idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

66. Tractors & Bulldozers

"Allis-Chalmers Presents" is a 28-page color-illustrated booklet that gives complete specs on line which includes tractors, motor graders and power units. If you want to get a move on, fast, take a look at the equipment in this bulletin.

67. Self-Dumping Hoppers

Roura Iron Works—You'll let out a big "Roura" for the self-dumping hoppers described in 4-page folder. How they operate, how they save and how they fit your particular requirements are pointed out in this bulletin.

68. Ball Bearing Units

Stephens-Adamson Mfg. Co—"When designing or re-designing, consider SealMaster ball bearing units for smooth, quiet operation," so suggests 4-page illustrated bulletin 649. Units are featured as being permanently sealed, self-aligning, prelubricated and having no housing wear.

69. Blast 'em Clean

Ruemelin Mfg. Co.—Blast cleaning cabinets for a wide variety of cleaning operations are detailed in 8-paged bulletin 32-B. They are adaptable for cleaning iron, steel, brass, aluminum and magnesium castings; for producing matte finishes on all metals or shapes; for scale removal; and for many other purposes.

70. Foundry Flasks

Black, Sivalls & Bryson, Inc.—Here's the latest BS&B "Foundry Flask Catalog & Price List." This 96-page metal-ring binder gives complete data on flask styles, pin lugs, bottom boards, squeeze plates, core plates, upsets, pins and bushings and accessories. It also shows how to estimate cost of flasks and to order them.

71. Soldering Gun

Velocity-Power Tool Co.—Want to speed up those soldering, sweating, brazing, preheating, melting and maintenance jobs? Then have a look at the features of the Century Torch-O-Matic trigger on-off air acetylene gas gun in 4-paged bulletin 1400-3. Pull—it lights; release—it's out. Saves time, saves gas.

72. Of Cores

Claud S. Gordon Co.—Here are two 2-paged bulletins that may be the answer to your coreroom problems. One deals with the Gordon-Campbell core hardness tester that is easy to use. The other covers the Gordon-Campbell transverse test core maker that prepares test samples just the way they should be made.

73. Spin 'em

Aimes Co.—Both horizontal and vertical centrifugal casting machines which can be built to meet specific production requirments are detailed in 4-page illustrated bulletin "Better Castings at Lower Cost!" Gray iron, steel or nonferrous castings with dry or green sand of permanent molds can be produced for large or small runs.

74. Got Hot Stuff?

Illinois Testing Laboratories, Inc.—The Alnor Pyro Lance described in 2-page data sheet 1724-D is a portable pyrometer that is designed for accurate temperature measurements under severe operating conditions in nonferrous foundries. It will handle temperature measurements up to 2300° F in molten brass, bronze, copper, aluminum and magnesium alloys.

75. Air Your Problems

Bellows Co.—There's a Bellows air-powered manually-controlled nonrotating air motor and control for practically any job involving pushing, pulling, clamping, feeding, lifting, squeezing or holding. All the data on these versatile air-actuated devices are presented in 36-page illustrated manual BEM. You'll find dimensions, specifications, performance data and application sugestions.

76. Desulphurizing

Allied Chemical & Dye Corp., Solvay Process Div.—16-page illustrated booklet, addressed to the foundryman, summarizes many of the advantages that can be obtained through the addition of Solvay dense soda ash to molten metal. This addition is reported to give sound castings at low cost because it reduces sulphur, increases fluidity, releases gases and impurities, provides automatic slag skimming, improves machinability of finished castings and permits broad operating control limits.

77. Grinders

Stamford Engineering Co.—Our British cousins across the pond come up with some mighty sturdy equipment. Two of these machines made by Luke & Spencer Ltd., are covered by two illustrated 4-page bulletins which describe a 16-in. high speed, dust exhausting, swing frame grinder and a duplex, high-speed, independent spindle grinding machine which is available for 20, 24 and 30-in. wheels.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies." "Trade Publications" or "Ideas for Foundrymen" in this issue—simply circle corresponding item numbers on accompanying cards

Helpful IDEAS

78. Foundry Lab Items

Claud S. Gordon Co. — Here's a packet of ten (count them—10) descriptive data sheets on products that fit into casting, mold and core checking and testing facilities in the foundry. Bulletins cover sand permeability, rammer-compression, sand washing, moisture, core baking, sample collection, mixers, core and temperature testing units.

79. Motors That Can Take It

Allis-Chalmers Mfg. Co.—Drip-proof and splashproof type AW and AWW squirrel-cage motors in ratings up to 800 hp and speeds to 3600 rpm are subject of 6-page illustrated folder 51B7693A which covers construction features with sectional illustration and performance with charts and tables.

80. Elevating Small Parts

Prob Conveyors, Inc.—Small parts are elevated automatically with the new Magnevator which is described in 12-page illustrated bulletin No. 300. This machine has a hundred-and-one uses in the foundry because it takes parts from shop boxes, elevates them to desired level and delivers them to conveyor, machine or processing operation magnetically.

81. Molding Aid

Masonite Corp., Chemical Div.—Industrial uses and properties of Masonex and Masonoid as core oil extender, sole core binder, replacement for cereal in molding sand, mold wash and coating, extenders and diluent for phenolic and urea core resins, and core paste and wash are listed in 5-page technical bulletin CD-1.

82. Furnaces, Blowers, Torches

Johnston Mfg. Co.—Among products illustrated in series of data sheets are crucible type brass melting furnaces; car bottom furnaces; pressure blowers for furnaces, forges and cupolas; nozzle mixing gas burners; proportioning reverse-blast low pressure oil burners; high lift vacuum type heating torches, and Dri-Flame nonclogging vacuum type heating torches.

83. Gravity & Power Conveyors

Standard Conveyor Co.—If you move materials, and what plant doesn't, you'll be interested in the wide variety of conveyors described and illustrated in 16-page bulletin No. 68. Conveyors and pneumatic tube systems in steel and brass mills, foundries and other shops are shown. Conveyor types include concave roller, escalator, live roller, gravity roller, belt and slat. You'll also see bucket elevators, gravity spiral chutes and upenders.

84. Welding Machines

A. O. Smith Corp., Welding Products Div. — Complete specifications for six series of alternating and direct current welding machines, each offered in various capacities, are found in 4-page illustrated bulletin WM-151. Features of each are described. Data on A. O. Smith welding electrodes of various types are included.

85. Weigh While Handling

Hydroway Scales, Inc.—Anything that is handled with cranes, hoists or similar equipment can be weighed while it is lifted with Hydroscale, a hydraulic crane scale that installs right on the crane hook. Information on Hydroscales with capacities up to 100,000 lb is contained in 8-page illustrated bulletin.

86. High-Temperature Lubricant

Acheson Colloids Co.—Case studies and application stories are employed in 4-page illustrated bulletin to show how "dag" colloidal graphite dispersions are combating friction under conditions of extremely high temperatures. Dispersions are usable at temperature up to 3000° F and higher.

87. Applications of Electric Heat

Edwin L. Wiegand Co.—Some of the more important uses of electric heat in the foundry are described in collection of bulletins. Details are given on mold drying, curing of shell molds, core baking and comfort heating with Chromalox radiant type electric heaters.

88. Industrial Radio Telephone

Mine Safety Appliances Co.—Details of the new MSA Telecrane FM carrier communications system for voice contact between cranes and loaders and various stations throughout the plant are explained in 4-page illustrated bulletin 1601-2.

89. Shell Molding

Dow Corning Corp.—Applications of Silicone release agents in the shell molding process and techniques to be used are subject of five illustrated technical data sheets "Silicone Notes" No. MR4. Available compounds, their properties and how-to-use-it information are included.

90. Foundry Equipment

Sutter Products Co. — "Special Foundry Equipment" is title of 6-page illustrated bulletin which briefly details such products as sand conveyor; rollover, power draw machine; and power rollover and draw molding machine which are designed to meet exact requirements of application.

91. Foundry Sand Additive

Weyerhaeuser Timber Co.—A tabulation of the physical and chemical properties of Silvacon, a foundry sand additive is feature of 4-page folder No. 10. Product is derived from Douglas fir bark and comes in fiber, cork-like and amorphous powder forms. A 5-page supplement to folder describes "The Use of Silvacon as a Filler in Core and Molding Sands."

92. Safety Vacuum Torches

Mahr Mfg. Co.—Get 'em both—bulletins 195 and 50-A. The first one offers specs and operating instructions on safety vacuum torches, the other describes a tilting type gas or oil-fired crucible melting furnace for nonferrous metals.

93. Vertical Core Ovens

Detroit Sheet Metal Works—Want to see pictures of a battery of DSM vertical core ovens? 4-page folder 52-5 offers photos of these ovens which can be gas, oil or electric types. Parallel and crossflow ventilation in ovens is diagrammed.

94. Furnace Engineering

Holcroft & Co.—"Blazing the Heat Treat Trail" is 8-page brochure which highlights the development of gas carburizing, carbon restoration, a short-cycle malleable annealing furnace, case-hardening process, radiant-tube heating and new case hardening technique.

95. Special Alloys

Alter Co.—To acquaint you with the standard Master alloys and special alloys produced by this company, a 24-page pocket-size descriptive booklet entitled "Master Alloys" is available. It features tabulated melting

or Foundrymen

points, density and weight data, metric conversions and equivalents and temperature conversion data.

96. Ah-Choo!

Gesundheit—We're all in favor of dust collectors too. So send for 4-page bulletin describing wet type dust collectors made by Van-Truer Co. They will remove dust and fumes from your processing operations. Units range in size from 500 to 40,000 cfm.

97. Sand Additive

Whitehead Brothers Co. — Lyquaflour? What is Lyquaflour? It's a nondusty compound of Lyquaface and woodflour which functions in foundry sand mixes to give it certain physical properties. But, why not send for 6-page folder? It will give you a lot more information.

98. Foundry Equipment

Sterling Wheelbarrow Co.—The complete line of light and heavy duty foundry flasks, core plates, wheelbarrows and carts, core and casting trucks and accessories are illustrated and specified in 54-page plastic-bound catalog 64A. Flasks are fabricated from rolled steel channel in practically all sizes.

99. Core & Mold Ovens

Carl-Mayer Corp.—Core and mold ovens of all kinds, including rack, car, vertical, horizontal monorail, rolling drawer, portable and special types, ingot mold dryers and heat treating furnaces are shown and described in 14-page bulletin 53-CM.

100. Aluminum Alloys

Apex Smelting Co.—Composition, typical mechanical properties and heat treatments comprises information presented in tabular form on standard aluminum alloys in 13-page loose leaf catalog. Alloys are produced under rigid control of the Quantometer, an electronically controlled spectrograph which gives complete analysis in few minutes.

101. Air Cylinders

Lindberg Engineering Co. — Foot, base, pendulum, trunnion, rabbet, flange and double end rod mountings are available on line of air cylinders covered in 16-page bulletin 731. Dimensional diagrams, tabulated bore dimensions and features are presented. Cylinders can also be used for low pressure hydraulic applications (400 psi maximum).

102. Special Purpose Conveyors

Allied Steel & Conveyors, Inc.—Illustrated catalog 951 of 8 pages describes examples of special purpose custom-built conveyor and material handling systems designed, fabricated and erected by this company. Included are systems for handling products overhead and for hot pigs.

103. Colloidal Graphite

Acheson Colloids Corp.—Here are two interesting 6-page illustrated bulletins, No. 426 on "dag" colloidal graphite for metalworking operations and No. 427 on its use as a parting compound. Former tells of uses in drawing, forming, die casting, ingot mold stripping and other operations.

104. Fine Grinding Machines

Buehler Ltd.—Looking for a fine grinding machine for your metallurgical lab? If so, or if you might someday, send for this 4-page illustrated folder that describes the machines and lists accessories. Hand grinders for metallurgical specimens are also covered.

105. Cupola Lining

Cargan Products Co.—Cargan Gun Mix, a cupola lining, is available in car or truck loads, l.c.l. quantities, bagged or bulk. It is described in 6-page illustrated folder which says it has high fusion point, rammed density, plasticity and fast glazing action.

106. An Auto Foundry

Pettibone Mulliken Corp. — Read the illustrated story of foundry operations at Studebaker Corp. in 12-page October 1952 issue of "Better Methods." An interesting history of Studebaker is also featured.

107. Mold Maker

Jolt squeeze, rollover and draw are operations that are performed speedily on a machine of this name which is detailed in bulletin No. 115 offered by the Milwaukee Foundry Equipment Co. Three sizes are available to handle up to 47 x 47 in. flasks.

5-53

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16	33	50	67	84	101	118	135	152	169
17	34	51	68	85	102	119	136	153	170

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108. Bin Feeding Device

Gerotor May Corp.—Positive displacement method of feeding stubborn materials noiselessly from bins and hoppers is principle employed by the PneuBin, described and illustrated in 4-page bulletin. It makes use of a pulsating flexible diaphragm to which air is alternately admitted and exhausted.

109. Warm Air Furnaces

Jackson & Church Co.—Described and illustrated in 4-page bulletin 6c/JA are three series of gas or oil-fired warm air furnaces with capacities of 112,000 to 3,800,000 Btu output. Complete specs are given.

110. Self-Cleaning Conveyors

Carrier Conveyor Corp.—Principle of operation of the self-cleaning Natural Frequency conveyor is covered, along with engineering details and specifications in 12-page illustrated catalog. Advantages are said to be low maintenance, no dampening under load, high capacity and low power requirements. Various types and applications are shown.

111. Abrasive Wheels

Mid-West Abrasive Co. — Filter-cushioned snagging wheels and self-dressing centerless grinding wheels are described in two illustrated 4-page bulletins. Application hints and available sizes and types are detailed.

112. Ovens

Sermax Corp.—Two data sheets are devoted to details of a vertical conveyor oven for production heating and small batch ovens for utility and production service.

113. Anticorrosion Coating

Industrial Metal Protectives, Inc.—8-page illustrated bulletin Z-251 and accompanying data sheets tell all about Zincilate, a one-coat self-protecting anticorrosion coating. It can be sprayed, dipped or brushed on a wide variety of items. Engineering and application data are included, as are characteristics of the material.

114. Sealing Cements

Lake Chemical Co.—"They're Indispensable" is title of pocket-size folder presenting brief descriptions of pipe and tank sealing compounds and regular and special soldering fluxes.

115. Electronic Core Baking

Induction Heating Corp. — With Washington economy minded, here is a chance for you to read about a company that is also so inclined. Six-pages of "Economy Report on Electronic Core Baking" is an exact reproduction of a report prepared by the engineering department of an eastern company. Actual savings (itemized) are well up in the thousands of dollars.

116. Industrial Ovens

Burdett Mfg. Co.—Typical applications of industrial ovens which feature gas-fired 'Radiant Heat' combustion system are shown in 8-page folder. Construction of the burner is illustrated, and what users say about these ovens is reported.

117. Fire Clays & Brick

Illinois Clay Products Co. — Brief descriptions of Goose Lake fire clay brick, fire clay flour, silica mix, ground and screened fire clay and Grundite bond clay are featured in 4-page folder.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

118. Aluminized Cast Iron

Whitfield & Sheshunoff, Inc.—Information on the aluminizing of cast iron, written by two metallurgical consultants, is contained in this reprint of a FOUNDRY article "Aluminized Cast Iron." The process is described, and resulting benefits are detailed by the authors.

119. Shell Molding

Here's a FOUNDRY reprint you should have! Entitled "The Shell Molding Process—Its Mechanics and Applications" it has much basic data on this most interesting and utilitarian process. Using word and picture, it covers the latest techniques and methods in this field. Graphs show mechanical properties vs. pour temperature for various metals. This one's a must if you have a foundry.

120. Risering Principles

Although there is no simple approach to the risering of castings, this reprint of a FOUNDRY article states that an understanding of the fundamentals of metal solidification and riser application can assist the foundrymen in this important phase of good foundry practice. Article has time-temperature curves for various materials, cross sectional views and a wealth of other info. Ask for "The Principles of Risering."

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ADDRESS _____

CITY AND STATE _____

This card MUST be completely filled out. Please TYPE or PRINT.

5-53

(*Continued from page* 316)

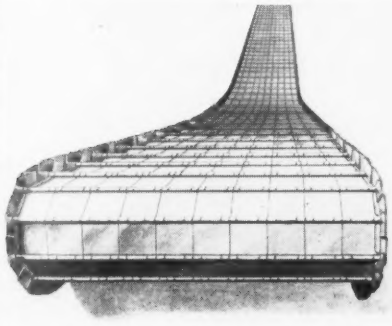
double gage for checking thickness of weld on flat saws. Its portability permits the welder's use to service a battery of band saws. It also can be installed permanently. Overall dimensions of the machine are 7 x 7¾ x 12 in. Weight is 31 lb. The welder operates on 110-v ac, 60 cycles, and has an 8-foot cord.

For More Details Circle No. 13—Page 319

Power Impact Tools: Cornwell Quality Tools Co., 1018 Cleveland Ave., Mogadore, O.—Complete line of power-impact sockets, extensions, adapters and drivers for use with any standard air or electrically powered tool is manufactured from solid bars of chrome-molybdenum steel. Sockets are available in square or hexagonal openings for nut sizes from 3/16 to 3½ in. with drive sizes from ¼ to 1½ in. They can be furnished in both standard and deep lengths. Extensions are available from ¼ to 1½ in. drive sizes in a wide range of standard lengths. Adapters are obtainable to permit interchanging of sockets with other drive sizes of impact power tools.

For More Details Circle No. 14—Page 319

Hinged-Steel Belt: May-Fran Engineering Inc., 1710 Clarkstone Rd., Cleveland 12—Hinged-steel conveyor belting for the mechanized



handling of hot castings, metal scrap or other sharp and abrasive materials is constructed of heavy gage steel. It can be assembled in almost any width or length from stocked component parts. Precision formed, heavy gage, hinged steel links are assembled in horizontal rows by high-carbon steel rods passing through the formed flanges of the links. These rods also are inserted and fastened into the side chains so that the chain drive becomes an integral part of the belt. Interlocking side wings welded to the outside belt links remain engaged even when the belt travels from one level to another or over the power or idler conveyor sprockets. Looped flanges of the assembled belt links form a horizontal cross-rib at each belt

CESCO *RIGHT... before your Eyes!*

New, Larger COVER GOGGLES

fit over ALL modern glasses...

New CESCO **Cover Goggles** fit well over all popular styles of glasses— even over extreme types such as these.

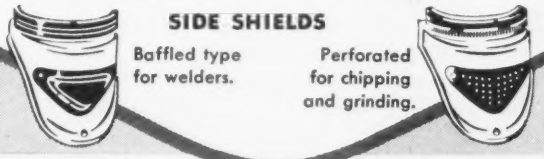
FEATURES

Lightweight, sturdy plastic with contoured edges. Weight is well-distributed for comfort and safety.

LENS VENTILATORS
Slots in edges of lens frames and rings are offset to baffle air flow.

HEADBANDS
Three types, all fully adjustable—Comfort King round rubber, flat rubber, or elastic.

SIDE SHIELDS
Baffled type for welders.
Perforated for chipping and grinding.



The *NEW* CESCO series 548 and 549 Cover Goggles are 20% larger than former cover goggles and will fit comfortably over all popular styles of men's or women's glasses. Newly designed, contoured edges eliminate pressure points on the nose and seal out flying particles or light flashes. Larger air space within goggles reduces fogging.

Screw-type retaining rings permit quick lens change from front. Standard 50mm lenses set flush with rings to deflect flying objects. Chippers style has indirect ventilation through slotted lens rings and direct ventilation through perforated side shields. Welders and dust models have indirect ventilation through side shields. Simplified bridge adjustment. Choice of 3 adjustable headbands: elastic, flat rubber or Comfort King round rubber.

For a really modern goggle, there is nothing better than the **No. 548** CESCO Cover Goggle. It is *"Right... before your eyes!"*

See or write your CESCO safety equipment distributor for full details

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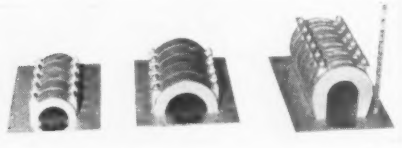
pitch, assuring steady flow of materials, even on inclines. Cleats or pockets can be welded to the belt at intervals for additional protection against fall-back or jamming.

For More Details Circle No. 15—Page 319

Plate Magnets: Dings Magnetic Separator Co., 4708 West Electric Ave., Milwaukee 46—Company's redesigned line of permanent plate



magnets for removal of tramp iron from material carried in chutes and ducts or on belts is available in a complete range of sizes. New magnet design is said to increase magnetic strength by as much as 50 per cent. Strength of the new magnets, which are Mill Mutual approved for Class A and B installations, is certified and guaranteed for the mechanical life of the unit.

For More Details Circle No. 16—Page 319

Adjustable Saw: Allway Mfg. Co., 2082 Boston Rd., New York 60—Multipurpose saw affords instant adjustment of blade to any plane and angle combination. One full turn of lever allows blade to pivot and lock on 45-degree steps covering 180 degrees. A half-turn allows the blade to be rotated and locked in any plane. When adjusted to a desired angle, the blade can be locked for use as mitre rule and square. Blades are easily removable. Saw cuts metals, wood and plastic. Available with 10, 14, 18 or 24 teeth per inch, the blades are made of specially tempered alloy steel with hardened teeth and flexible back.

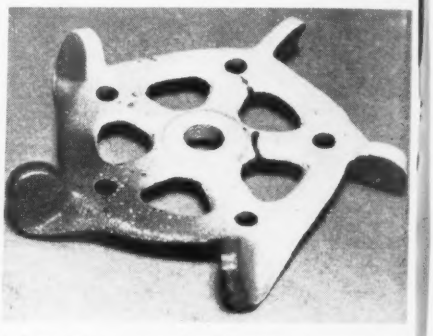
For More Details Circle No. 17—Page 319

Small Sand Muller Is for Laboratory Testing

SAND muller scaled to duplicate production control in sand testing laboratories is similar in design and operation to production size mullers produced by the same manufacturer. Driven by a 1-hp vertical motor, it has a 24-in. pan and a rated batch capacity of 50 lb of material. It is furnished with motor, starter supporting base, additions funnel, crib and muller scrapers and dust-tight hood, fully equipped for all laboratory and small production mixing requirements. Outstanding features include adjustable spring-loaded mullers; V-belt drive with torque arm speed reducer; removable or extendable supporting legs and positive liquid additions funnel accessible without removal of dust cover. It also offers easy access to drive unit, a circular discharge door and improved facility for plow adjustments. Manufacturer is National Engineering Co., 549 West Washington Blvd., Chicago 6.

For More Details Circle No. 20—Page 319

Dye Penetrant: Magnaflux Corp., 7300 West Lawrence Ave., Chicago 31—Dye penetrant is sprayed from pressure can onto clean surface to be tested. After a cleaner has been sprayed on the surface and removed by a quick wipe, an even coat of developer is brushed on, followed in a few seconds by inspection. Cracks show up as bright, red lines, and pores or leaks in tanks show as bright, red spots. No power or special light is required. The inspection is best and cheapest when applied to local areas of large parts or in remote locations where only a few parts are to be tested.



For More Details Circle No. 18—Page 319

Gas Burner: North American Mfg. Co., 4455 East 71st St., Cleveland 5— Nozzle-mixing gas burners with high effective turndown are claimed to be ideal for installation on multiple purpose furnaces. Furnaces equipped with them can be operated at from 400 to 1800°F. Burners may be operated with air pressures ranging from 0.1 to 16 oz at the burner, giving a choice of capacities from 28,000 Btu per hour (1½-in. air pipe size) with 0.1-oz air pressure to 2,620,000 Btu per hr (4-in. air pipe size) with 16-oz pressure. Burner is offered in five sizes and is shipped with mounting and tile already in an assembled unit that simplifies installation.

For More Details Circle No. 19—Page 319

Antirust Paint: Speco Inc., 7308 Associate Ave., Cleveland 9—The company's line of antirust paints has been expanded to include three new colors, red, gray and green, in addition to the standard black, aluminum and clear. One application of the paint assertedly stops rust completely for years. For use on all metals, the new colors are said to

(*Continued on page 324*)

INTRODUCING . . . the new member of the Dravo Space Heater family

DRAVO GAS-FIRED

Suspended Type

UNIT HEATER

—for heating and ventilating commercial and industrial buildings

—for process drying

Now . . . Dravo Corporation offers you the new Dravo Gas-Fired Unit Heater, ideal for installations requiring a heating output of 68,000 to 172,000 Btu. This new addition, joining the Dravo *Counterflo* Space Heater models, makes available a range of Dravo Heaters from 68,000 to 2,000,000 Btu.

ENGINEERED DESIGN

The Dravo Gas-Fired Unit Heater is ruggedly constructed with a cast iron heat exchanger, cast iron burners and a heavy-gauge steel exterior jacket with baked enamel finish . . . all designed for years of satisfactory service.

EASY INSTALLATION

The Dravo Gas-Fired Unit Heater is delivered completely assembled. Installation requires only hooking up gas connection and exhaust stack. Units are wall-hung or suspended from roof trusses to conserve valuable floor space.

DESIGNED FOR SAFETY

Dravo Gas-Fired Unit Heaters are approved by American Gas Association and listed by Underwriters' Laboratories, Inc. Safety pilot turns off gas automatically if the pilot light goes out or burns too low for perfect ignition. The cast iron heat exchanger and combustion chamber withstand corrosion and will not burn out.

EFFICIENT OPERATION

The Dravo Gas-Fired Unit Heater has a minimum heating efficiency of 80%. The draft hood prevents down drafts, absorbs all excessive chimney action and conserves heat. The heater delivers the exact amount of heat where you want it . . . when you want it. Automatic thermostat controls are available if desired.

AVAILABLE NOW

Units are available in a variety of sizes from 68,000 to 172,000 Btu, equipped with a fan or blower. Blower models are recommended for installations requiring heated air at greater velocity or against greater static pressure.

WRITE FOR INFORMATION

Get the complete details now describing the new Dravo Gas-Fired Unit Heater. Use the coupon.

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for better
ALUMINUM castings
at lower cost

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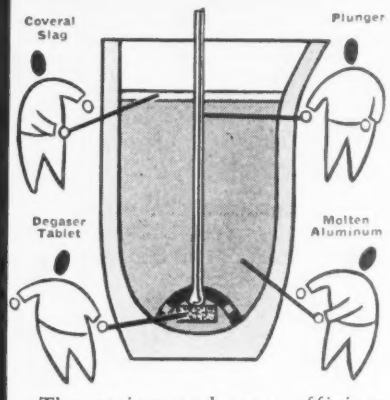
TREATMENT



The easiest and most efficient method yet devised for degassing and grain refining all aluminum alloys.

* *Reduces metal loss*
* *Prevents oxidation*
* *Removes dirt and slag*
* *Metal-free dross*
* *Eliminates gas holes*
* *Refines grain size*
* *Aids feeding*
* *Increases fluidity*
* *Increases physicals*

**EASY—EFFICIENT
ECONOMICAL—SAFE**

Melt aluminum under protecting layer of FOSECO COVERAL #11. Ten minutes before pouring, plunge a FOSECO DEGASER #190 tablet into the liquid metal. Skim the dross and the metal is ready to produce finest castings.

FOSECO COVERALS — DEGASERS — GRAIN REFINERS — Available for all aluminum alloys. Backed by nearly a quarter century of "know-how" and experience.

MAKE YOUR OWN TEST! Write today for samples and complete information. If you have a special problem, tell us about it—we will be glad to help you.

FOUNDRY SERVICES, Inc.
**280 Madison Ave., Dept. F
New York 16, N. Y.**

(Continued from page 322)

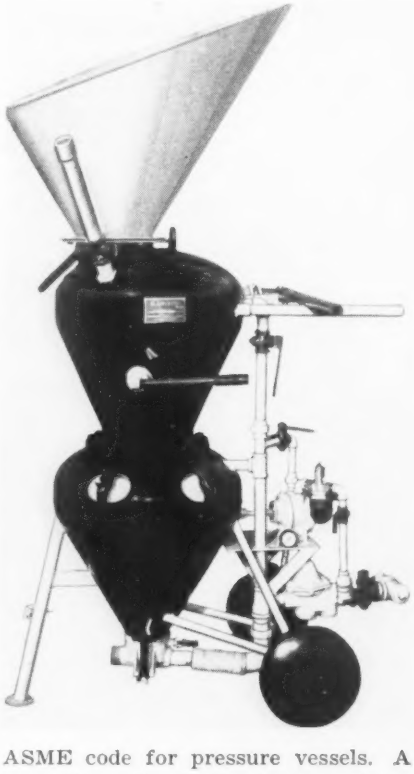
eliminate the need for a clear base coat except where other paints are desired as finish coats. Like the older colors, the new ones can be applied right over rust, indoors or out, without wire brushing, scraping or sandblasting.

For More Details Circle No. 21—Page 319

Grease Guns: Lincoln Engineering Co., Natural Bridge Ave., St. Louis 20—Lever type grease guns come in four models: a 21-oz capacity gun that develops 10,000 lb pressure and is finished in gun metal blue lacquer; a 21-oz capacity gun that develops 10,000 lb pressure and is nickel plated, and two 32-oz capacity guns, both nickel plated, that develop, respectively, 4300 and 10,000 lb pressure. They can be filled by suction or from the manufacturer's filler pump. All models include long hydraulic coupler extensions for contacting fittings that are hard to reach and a filler nipple for refilling guns from the filler pump.

For More Details Circle No. 22—Page 319

Gun: Blastcrete Equipment Co., 11154 Santa Monica Blvd., Los Angeles 25—Company's gun for refractory materials has been completely redesigned to provide easier, faster loading, better control of material flow and air pressure, and to meet the

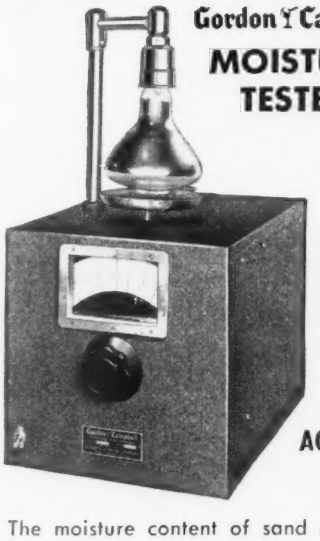


ASME code for pressure vessels. A new slide valve in the loading chamber permits fast, easy loading, and a new feed control makes it possible to adjust material flow to any desired amount or to cut off material

Guessing Moisture Content?

IT DOESN'T PAY!

USE THE Gordon-Campbell MOISTURE TESTER



ACCURATE FAST

The moisture content of sand mixtures is too important a factor in the production of good castings to be determined by guesswork. Frequent testing is the only sure guide to maintaining the most favorable moisture percentage.

The Gordon-Campbell Moisture Tester offers an easy, fast, accurate method of finding moisture content. With only a few minutes required for a test, the sand can be corrected promptly to avoid scrap losses.

Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units.

Gordon-Campbell sand testing units conform to the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRYMAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

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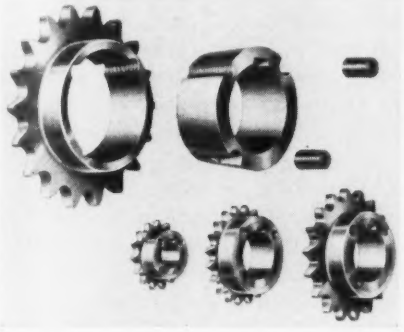
instantly. Air pressure reportedly can be controlled to any degree desired. The gun now handles materials with up to 6 per cent moisture. It places 1 to 5 cu yd per hour, or approximately 1¼ cu yd per hour per 100 cu ft per minute of air. It also handles many lightweight aggregates of the types used in construction work or for other purposes.

For More Details Circle No. 23—Page 319

Sprockets: Morse Chain Co., 7601 Central Ave., Detroit 10—Sprockets keyed to shafts for easy, quick installation and having the



firmness of a shrink fit are available from distributors' stocks to meet the requirements of most industrial applications while eliminating the delay and expense of reboring to fit shafts. Shafts need not be turned or ground to get tight fits. Sprockets have no flanges or protruding parts and require no more space than standard sprockets. They fit any roller chain manufactured to American standards, No. 40 through 100. Hub-on-one-side sprockets of this type are available in ½, ⅝, ¾, 1 and 1¼-in. pitches. Number of teeth range as high as 112. All bushings and smaller sprockets are individually packaged.

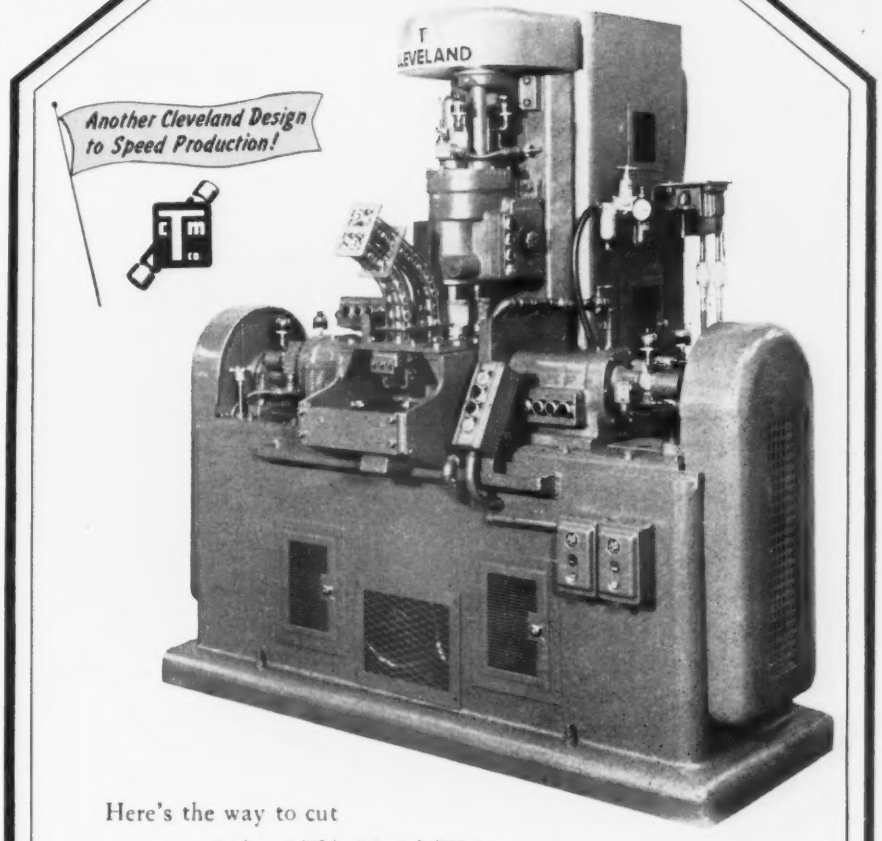
For More Details Circle No. 24—Page 319

Trolley System: Universal Standard Inc., 633 Washington Rd., Pittsburgh 28—Safety trolley system, featuring a collector which can carry loads from 50 to 2000 amp, is applicable wherever current collectors are used. A conductor, enclosed within an insulating sleeve, is split at the bottom to provide for entrance. It surrounds a trolley shoe supported on a ball joint for flexible action. The shoe is made of copper alloy that matches the conductor, which also serves as a guide track. Shoe is spring supported to compensate for vertical irregularities.

For More Details Circle No. 25—Page 319

Blower-Exhauster: Brundage Co., 562 North Park St., Kalamazoo 11, Mich.—Compact blower-exhauster for ventilating and for smoke, heat

1308 tee fittings per hour!



Here's the way to cut costs on tee fittings! This Model FT-1 will tap 1308 pieces ½" - 14 per hour at 100% efficiency. Also handles ¾" and 1" sizes. All spindles have their own lead screw feed—assuring the precision for which Cleveland Fitting Machines are famous. Produced parts are square and within the required tolerances. Set-up and change-over time is reduced and tap life increased up to 25%. For greater efficiency this Model may be grouped in batteries of three with one operator to each battery.

If you make fittings of any size or type it will pay you to consult Cleveland engineers. Their know-how can save you money.

Write today for Catalog No. **FN- 58**

THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.

CANTON 6, OHIO

For Better Tapping - - Faster!

CLEVELAND lead **fittings machines** screw

and fume removal does not require a cabinet or complicated superstructure. It can be fastened directly to a wall, up out of the way. The angle of discharge can be adjusted to any degree. Motor, bearings and all other parts are designed for efficient, quiet operation.

For More Details Circle No. 26—Page 319

X-Ray Cabinets: Westinghouse Electric Corp., Section X, 2519 Wilkens Ave., Baltimore 3—New line of all-metal floor and wall cabinets for use in x-ray darkrooms features

rounded corners and tubular shelves for fast, efficient cleaning and convenient cassette, film and hangar storage locations for easy film loading. A trash disposal drop, film identification printer unit and a built-in cabinet safelight are available if desired. Finished in green, these cabinets come in such a variety of sizes that they allow preplanned use of floor space to the nearest half-inch.

For More Details Circle No. 27—Page 319

Cooling Crane Cabs: Lintern Corp., Route 20, East, Painesville, O. —Two air conditioning units for conditioning cabs on traveling cranes operating, respectively, in temperatures up to 115 and 140°F have applications in foundries and other industrial installations. They supplement the company's larger unit for providing working conditions of 80 to 85°F in crane cabs operating in ambient temperatures up to 180°F. For cranes operating in lower temperatures, as specified, the new units are stated to mean an appreciable saving over the larger units and to serve the purpose equally well.

For More Details Circle No. 28—Page 319

Pyrometer Controller: Thermo Electric Co., Fair Lawn, N. J.—Pyrometer controller for use with iron constantan, chromel alumel or platinum platinum-rhodium thermocouples automatically controls the temperature of batch processes or equipment suitable for two-position control action. Twelve standard scale ranges are available for controlling temperatures from 0 to 3000°F. Said to combine the measuring accuracy of a null balance potentiometer circuit with the sensitivity and speed of an electronic control system, the instrument has only one moving part, a magnetic

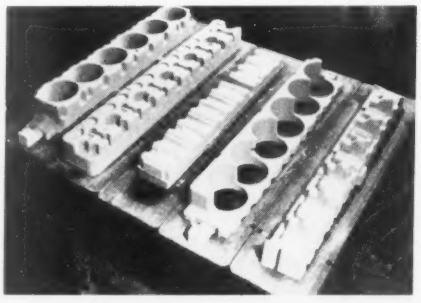
(*Continued on page* 328)

Cope Handler Increases Versatility of Coreblower

BETTER balanced production with increased flexibility is the result of recently developed auxiliary equipment for use with the Roto-Core automatic core production machine introduced last year by Osborn Mfg. Co., Cleveland. Five separate cores now can be produced simultaneously at the rate of over 300 per hour, using the new cope handler on that machine. When a cope handler is used, the core machine has the versatility of producing long-run or short-run core production, depending on individual casting requirements.

At the gray iron foundry, International Harvester Co., Indianapolis, five separate cores are produced simultaneously on the automatic unit, thus assuring a complete set of cores as required for each truck engine mold, as shown in small illustration.

International now maintains a balanced production to suit individual core requirements. To change any one corebox, the sub blow plate and platens are removed and replaced with the next corebox to be run. This is accomplished easily in one or two minutes since the floating platen and the sub blow plate on which the halves of the corebox are mounted are carried in cradle arms on the indexing table.

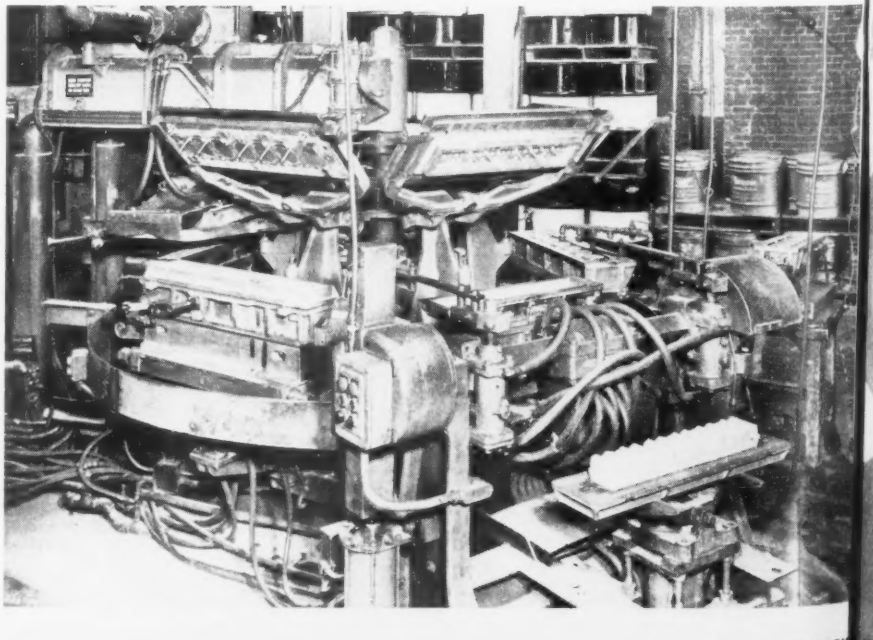


At the coreblowing station, a master blow plate on the sand reservoir has blow holes positioned to suit all five different cores to be blown. Each individual sub blow plate, on the cope handler unit, has blow holes to suit the individual core box.

The cope handler automatically lowers the cope half of the corebox and sub blow plate over the drag half of the corebox at the blower station, and then takes it out of the way after the core is blown. At the next station the drier is added. The core then is rolled over and drawn at station three. At the next two stations the boxes are made ready for a repeat cycle.

The core machine combines the following coremaking operations automatically: (1) Blowing the core and drawing the cope half of the corebox; (2) Removing the blown corebox from the blower so that the drier may be positioned on the bottom half of the box; (3) Transferring the core to the rollover and draw machine which extracts the blown cores from the boxes ready for baking; (4) Handling empty coreboxes into the blowing machine.

For More Details Circle No. 29—Page 319



1913

1953

40 years of service

This year City Pattern Foundry and Machine Company is celebrating its fortieth year in business; forty years that have marked many gratifying changes in our plant size and facilities. In 1913, we produced our first pattern in a small second story shop with a total complement of two employees. Today in one of the largest and best equipped plants in the industry our employees number close to three hundred.

However, one thing has *not* changed in forty years . . . that is our unvarying goal to produce the finest in pattern and machine work in the most efficient and economical manner possible.

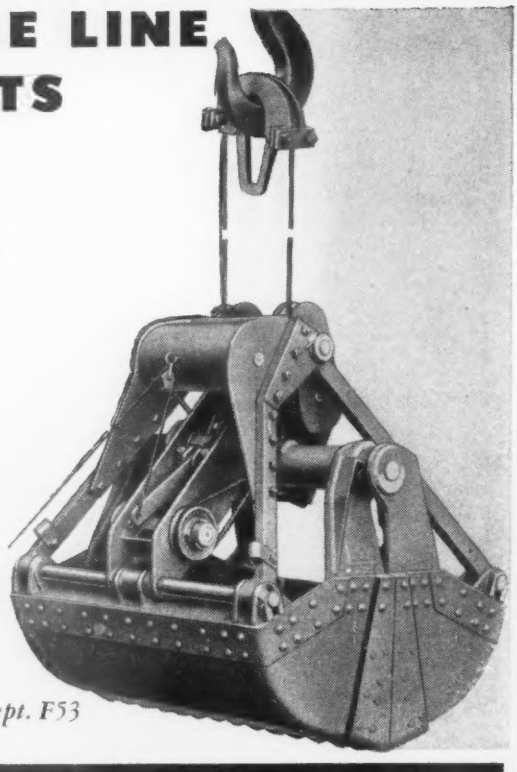
To the many loyal companies who have made possible the City Pattern Foundry & Machine Company of 1953, we pledge continued efforts to constantly keep our skills and facilities abreast of their needs.

CITY PATTERN

FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICHIGAN

ERIE SINGLE LINE BUCKETS



ILLUSTRATED is the hook-on type, for intermittent service. It is reeved and ready for operation on overhead traveling crane, monorail hoist, locomotive crane, derrick, ships tackle or any other hoisting device which has but a single hoisting drum available for bucket duty. Just slip the yoke over the crane hook.

Erie Single Line buckets are also available in the direct-reeved type for permanent installation. Describe your Single Line bucket need — we'll give you our recommendations for we build all types and sizes.

● *Write for Bulletin 402, Dept. F53*

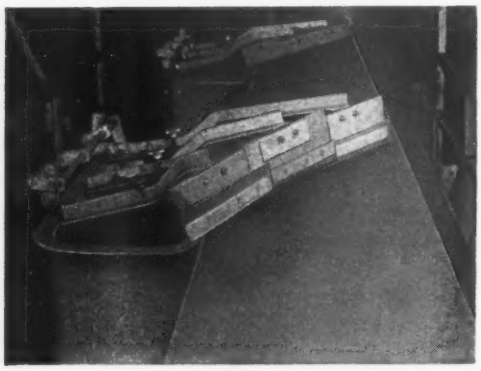
ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 468 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

PROTO PLOW

(Sand Proportionating Automatic Plow)



RESULT

• BETTER CASTINGS AT LOWER COST

Tested and approved by a number of progressive foundries. Why not discover what PROTO PLOW will do for you? Our engineers are at your service.

FEATURES

- Eliminates manual operation of plows, reducing labor and supervision.
- Feeds each hopper according to its needs.
- Feeds all hoppers simultaneously.
- Eliminates down time of molding machines due to manual operation of plows.
- Preserves temper and texture of molding sand.
- Reduces to vanishing point amount of sand going over head pulley.
- Eliminates need for large hoppers in new foundries.
- The first cost is the only cost. No power required.
- Tailor made to fit conditions in your foundry.

MANUFACTURED BY

FACTORY SPECIALTY CORP.

3418 Mc Dougall Ave. Detroit 7, Michigan

(Continued from page 326)

control relay which throws positively when the process calls for a change of heat. Detection of temperature deviations of from 1 to 1½-degree F. is simultaneous with the measurement in the potentiometer circuit.

For More Details Circle No. 30—Page 319

Loader: Baker-Lull Mfg. Co., Dept. KP, 314 West 90th St., Minneapolis 20—Loader for materials handling work in snow, mud and rough terrain combines ten handling

attachments to service a wide range of industrial requirements. Available in three models, with 2500, 4000 and 6000-lb capacities, it mounts on Case, Minneapolis-Moline, Shepherd and Oliver industrial tractors. The tilting tower design permits efficient digging, dumping, loading and unloading in the forward-tilt position and facilitates effective balancing and elimination of spillage in the backward-tilt position. Double-acting hydraulic cylinders tilt the tower 20 degrees forward and 9 degrees to the rear of center. Lifting height of the largest model is 100 in., and higher lifts are optional. The loader is sold with adjustable lifting forks, coal bucket, snow bucket, material bucket, bulldozer blade, reversible angledozer blade, crane lifting hook, V-type snow plow, lifting platform and gas-powered sweeper.

For More Details Circle No. 31—Page 319

Checker: Geo. P. Reintjes Co., 2517-19 Jefferson St., Kansas City 10, Mo.—Circular well type open-hearth furnace checker is formed principally with one shape of refractory. Tiles are centered by a tongue and groove arrangement that also reduces "overlap" to a minimum. The circular well is said to require less power from the exhaust fans. On the reverse cycle, the air for combustion absorbs heat rapidly by scrubbing the walls with a circular movement. The method of construction is particularly adaptable to two-pass checkers, where pressure drop creates excessive strain on fans. Dust can be cleaned from second pass of a two-pass checker system by oc-

casional lancing, and the circular walls lend themselves to cleaning by rotary turbines. Heat recovery is reportedly improved.

For More Details Circle No. 32—Page 319

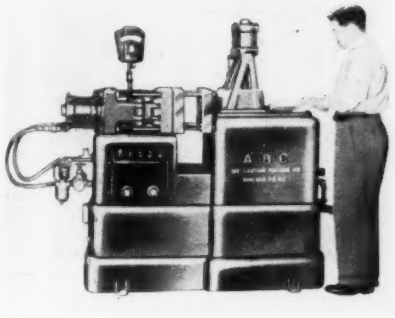
Batteries: Electric Storage Battery Co., P. O. Box 8109, Philadelphia 1—Company claims that new materials and structural changes enable its new line of batteries to offer 20 per cent more capacity in the same space as the old models. Polyethylene nonoxidizing slotted plastic tubes keep active material in constant contact with the grid spines, yet permit free electrolyte penetration throughout the active material. A polyethylene acidproof tube sealer fitted to the bottom of the positive plate seals in active materials and maintains high battery capacity. Corrosion-resistant grids, larger positive plates, extra heavy negative plates, pormax separators and other features are incorporated in the battery.

For More Details Circle No. 33—Page 319

Welding Electrode: General Electric Co., Schenectady 5, N. Y.—General purpose, mild steel welding electrode is a direct current, reverse polarity rod meeting AWS Class E-6010 specifications. Designed for optimum flexibility of application with reduced operator effort, it is said to facilitate butt, fillet, lap joint and edge welding in all positions. Company engineers state that it assures a high ratio of inches-of-welding to inches-of-electrode because of its ability to take high currents and its freedom from reaction pitting, fingernailing, spatter and blistering of the coating.

For More Details Circle No. 34—Page 319

Die Casting Machine: ABC Die Casting Machine Co., 339 West 112th Place, Chicago 28—New 1½-lb zinc die casting machine is designed for



fast cycling to produce small castings or for economical short runs. Air-operated, it is capable of a free cycling speed in excess of 1000 shots per hour. Company reports that it is easy to set up and operate and

When you look at air tools
... LOOK INSIDE

THE OLD WAY

A two-piece shaft, with male and female tang drive; double bearings required at center of tool.

THE NEW WAY

A one-piece shaft, with keys to drive the rotor which "floats" on the shaft; only one bearing needed at center of tool.

An ordinary air tool has a two-piece shaft, joined by a male and female tang. This tang drive is subject to excessive wear, even when double bearings are used for support. When wear occurs, it means replacement of the entire shaft, and an expensive rotor.

A Buckeye air tool has a one-piece shaft, connected to the rotor by two keys; the rotor "floats" on the shaft. The keys are not subject to as much wear as the tang drive, and even when wear does occur, the keys are easily replaced at very low cost. The shaft and rotor continue in service.

The point is simply this: you can expect better service—at lower cost—from your Buckeye tools.

What are you waiting for?

Buckeye Tools CORPORATION
DIVISION 20 • DAYTON 1, OHIO

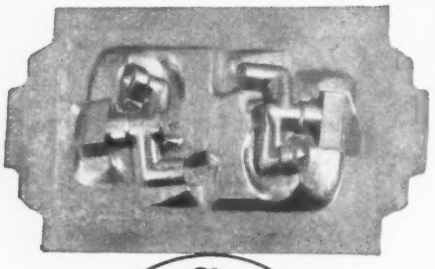
Portable Air and Electric Tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

MORE CASTINGS AT LESS COST

with PRESSURE-CAST ALUMINUM

MATCHPLATES and COPE & DRAG PLATES



Only one master pattern does it! From it we make you single- or multiple-pattern aluminum matchplates, casting them under pressure in plaster molds. We also make cope & drag plates of aluminum. Send us your pattern and we will give you a quotation without delay.

Toledo Matchplate Company

534 State Street • Toledo 2, Ohio

AFFILIATES:

PLASTER PROCESS CASTINGS CO.
6922 Carnegie Ave., Cleveland 3, Ohio

PATTERN MATCHPLATE CO.
35 McCaul St., Toronto, Canada

PRESSURE-CAST MATCHPLATES COPE & DRAG PLATES

JSCO

VIBRO-VEYOR

The ideal way to move your BULK MATERIAL . . . *and keep it moving* is with a JSCO Vibro-Veyor.

You'll save time and labor by equipping your plant with this rugged and economical conveyor . . . whether your problem is foundry sand, ore, dry aggregate, coal, chips or chemicals. Just install it and forget it. There's no spillage with the self-cleaning JSCO Vibro-Veyor and power consumption is low.

Write for further information.

KAYSING IRON WORKS

2500 Montgomery St. St. Louis 6, Mo.

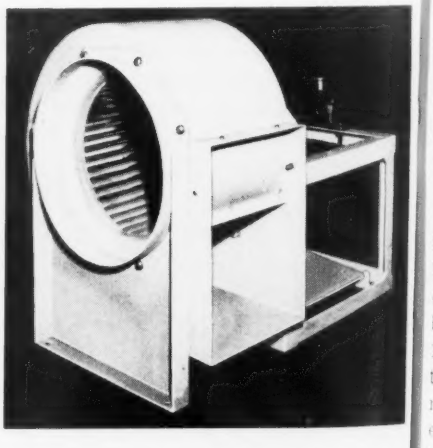
makes inexpensive single cavity molds. Features include an electronically controlled panel, 2½ x 10 x 10-in. die blocks, four tie bars and semiautomatic cycling with adjustable timing dwell on opening and closing of the toggle. Other specifications include 5-in. standard two halve die thickness, with 7-in. maximum; 20 tons of die locking pressure; 4-in. die opening; 1⅝-in. plunger at 1500 psi; 1½ lb of zinc per shot; zinc pot capacity of 275 lb; 100-125 psi operating air pressure and 110-125-v ac for electric power. The machine weighs 2000 lb and is 27 in. wide, 66 in. high and 80 in. long.

For More Details Circle No. 35—Page 319

Cleaning Spray: Kelite Products Inc., 1250 North Main St., Los Angeles 12—Industrial cleaner for application with a handsized pressure spray gun is said to remove grease, oil, wax, gums, dirt, dye, ink, cutting soap, light carbon and other substances with complete safety to all metals, plastics, rubber, porcelain, composition, concrete or wood and to do so without heat, odor, fumes, solvents, fire hazard or danger to skin. Most cleaning requires only spraying on and wiping off, without hard rubbing or scouring. The spray gun is charged with air pressure from any source, can be refilled in a few seconds and holds enough cleaner for several hours of average cleaning.

For More Details Circle No. 36—Page 319

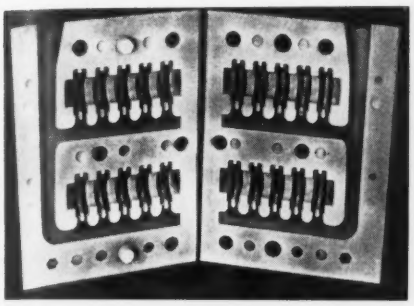
Roof Ventilators: Chelsea Fan & Blower Co., 639 South Ave., Plainfield, N. J.—Heavy duty, high velocity roof ventilator for industrial construction is especially well adapted for new windowless plant construction. For use primarily as an exhaust fan, it can be adapted easily to supply fresh air. Housing and hood are made of heavy gage steel, undercoated with noise deadening material. Automatic, built in louvers can be installed at base of unit, and hood can be removed for easy inspection. Fans are available in direct and belt



drive. Motors are ball bearing, totally enclosed or explosion-proof. Blades are die stamped, carefully assembled and dynamically balanced. Sizes are 12 to 48 in., 1300 to 20,000 cfm free air and 860 to 14,500 1/8-in. static pressure.

For More Details Circle No. 37—Page 319

Shell Molding Sand: Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh — Sand for shell molding is said to produce castings of good finish with the use of less resin because of its wide screen distribution and AFS fineness. Low confined expansion of the sand reportedly aids mold stability, and high refractoriness is stated to reduce surface defects. It is available both bulk and bagged. The company also offers crushed quartzite as backup material.



For More Details Circle No. 38—Page 319

Automatic Pipe Wrench: Faver Inc., 770 South Second West, Salt Lake City, Utah—All-purpose, automatic pipe wrench operates on a spring principle that makes it unnecessary for the user to adjust it by hand to any particular size. The wrench adjusts itself from 1/8 to 1¼ in. Handle is made of solid, round steel, knurled for nonslip grip. Jaw and base are high-carbon steel. Teeth are accurately machine cut and, according to the manufacturer, hold pipe so firmly that there is little possibility of slippage.

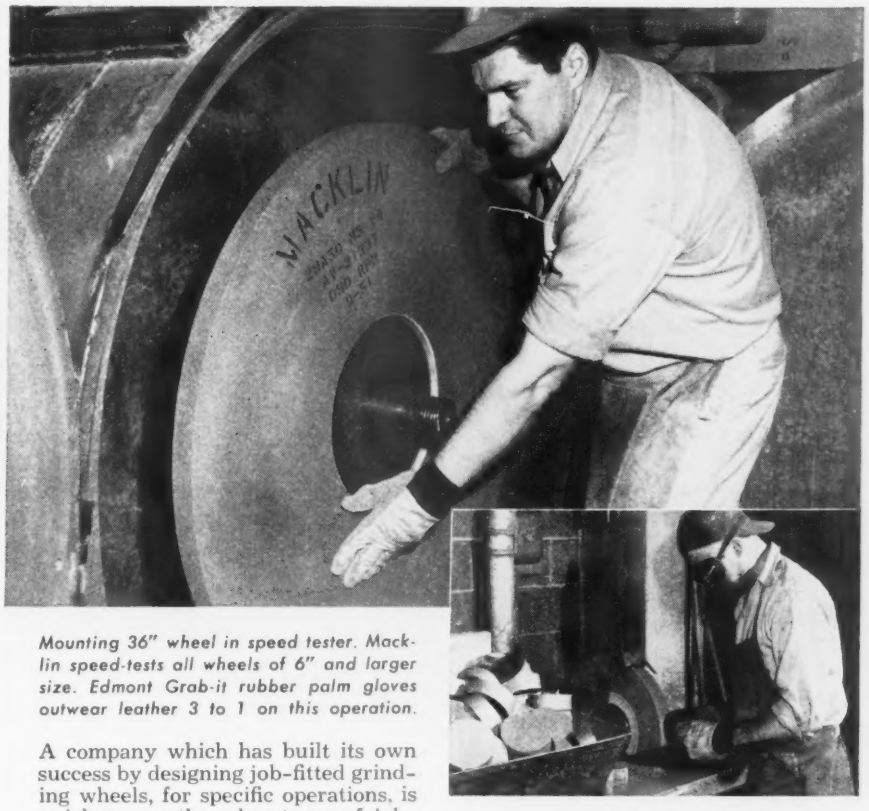
For More Details Circle No. 39—Page 319

Manual Crane: Abell-Howe Co., 53 West Jackson Blvd., Chicago 4—Manual crane designed expressly to eliminate or minimize friction and binding is available in capacities to 1 ton and features swiveling type end trucks. The crane's bridge girder is mounted to a pair of short wheelbase end trucks that not only swivel freely to insure proper alignment with track, but also adjust themselves to runway irregularities. The crane runs on large-diameter cast iron wheels fitted with precision ball bearings. Manufacturer also offers the end truck assemblies with instructions enabling a user to build his own crane.

For More Details Circle No. 40—Page 319

Cool rubber-palm gloves outwear leather 3 to 1 handling grinding wheels

— at Macklin Company, Jackson, Mich.



Mounting 36" wheel in speed tester. Macklin speed-tests all wheels of 6" and larger size. Edmont Grab-it rubber palm gloves outwear leather 3 to 1 on this operation.

A company which has built its own success by designing job-fitted grinding wheels, for specific operations, is quick to see the advantages of job-fitted work gloves to handle its extremely abrasive products.

By testing, Macklin found that Edmont gloves, coated on the palm with rough-textured natural rubber, wore 3 to 5 times longer than leather gloves, although they cost less. They also proved cool because of their fabric back, and were much preferred by employees for flexibility and grip.

Finishing, siding and trueing operations require much handling of abrasive wheels. Grab-it gloves wear 3 to 5 times longer on these operations.

Free Test Offer to Foundries: Properly job-fitted gloves pay dividends to management in fewer accidents, faster work handling, better employee attitude and 40% to 70% average savings in glove costs. Send us a brief description of your operations, materials handled and temperature conditions. *Without cost* we will supply samples of recommended gloves for testing on-the-job.

Grab-it gloves with rubber coated palm and safety cuff have proved best for stockroom.

NEOX (Reinforced Neoprene) Coated Gloves

Recommended for foundry use where oil, chemicals or heat are present. Resist both cutting and abrasion. The Edmont line also includes reinforced plastic coated gloves which have many foundry applications.

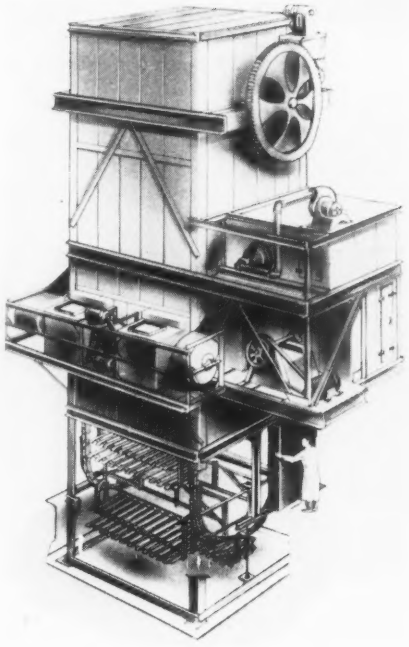
Edmont Manufacturing Company
1274 Walnut St., Coshocton, Ohio

Edmont job fitted gloves

Vertical Core Oven Designed to User's Needs

VERTICAL core baking oven, developed by Michigan Oven Co., 415 Brainard, Detroit 1, incorporates these features: Telescoping joints which expand and contract as the oven comes up to temperature, or cools, thereby preventing warpage; rugged structural frame, properly gusseted and reinforced; minimum of through metal at joints to minimize heat transfer; effective insulation to retain heat.

Heating and air handling equipment is mounted within the oven's insulated housing to prevent heat radiation. The air distribution system is designed to provide maximum heat uniformity in the baking section and to minimize loss through openings in the oven bottom where a chain conveyor carrying the racks and cores enters and leaves the oven. Efficiency of the unit's cooling section is said to permit removal of cores and plates by the bare hand. The oven can be heated with gas or oil or combination systems. Safety is provided by incorporating purging and flame failure devices with the customary light signals wired in a central control panel.



Exact specifications of the oven are adjusted to suit requirements of the individual foundry as regards weight of cores, production, fuel cost, etc.

For More Details Circle No. 41—Page 319

Blow Ring: Turner & Haws Engineering Co., 87 Gardner St., Boston, Mass.—Company's dust collectors feature self-adjusting blow rings mounted on a cast aluminum carrier. Blow rings are made in two sections, each half mounted on the carrier by two flexible rubber tubes. Regardless of dimensional changes caused by the filter bag's shrinking or stretching, each blow ring is held snugly in contact with the felt surface. As rings travel the length of the bag in their automatic cleaning operation, they adjust themselves to variations in bag diameter, expanding and contracting where necessary. The entire blow ring carrier assembly is mounted so that it floats laterally to accommodate the vertical alignment of the filter bags under all conditions. Both features are said to eliminate unnecessary chafing.

For More Details Circle No. 42—Page 319

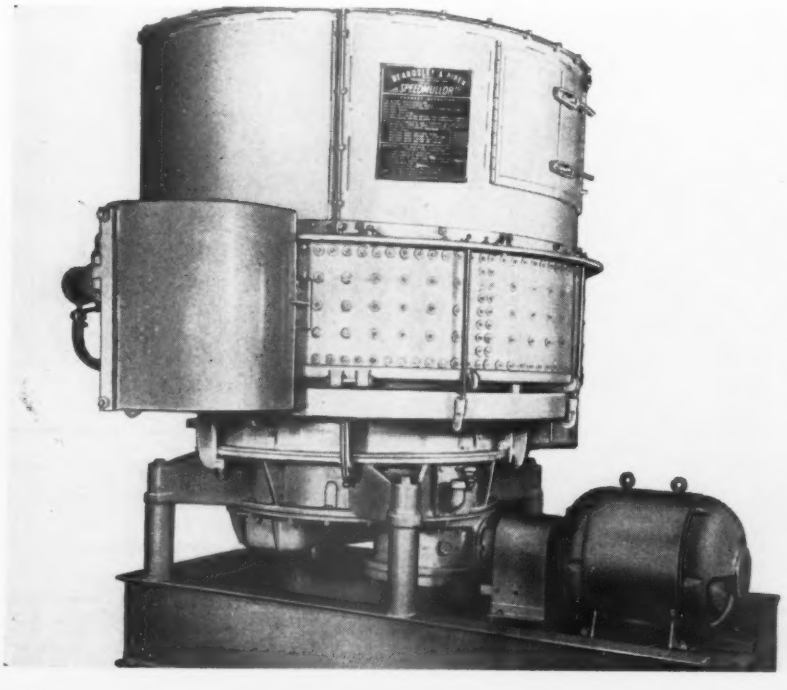
Oil Circulation: Trabon Engineering Corp., 1814 East 40th St., Cleveland—Oil circulating system utilizes a positive piston displacement principle and, according to the company, is a sure method of controlling the flow of oil under pressure to every bearing. Features of the system include flow rates up to 80 cu in. per minute; rotary type pump units available in complete range of discharge capacities; pump units with or without sumps that include motor, pump, dual-acting pressure switch, cartridge type filter, pressure gages, oil level gage and fill screen; sump units that include removable baffles for easy cleaning of tank, and metering valves to control accurately the flow of oil to each bearing in the sys-

(*Continued on page* 334)

Sand Muller Features New Plow Design and Construction

IMPROVED sand muller with high hourly capacity of sand mulled to its maximum physical properties features newly streamlined sand plows mounted at optimum lift angles to provide maximum mulling efficiency. Plows are mounted on a redesigned, lightweight crosshead of simple, clean-cut construction for low maintenance operation. Plows and other parts subject to wear are bolted for easy replacement, and plows and wear plates are coated with abrasion-resistant material. A removable gear transmission unit permits easy access for maintenance or repair. An involute pump is an integral part of the transmission. The muller also features directed force-feed lubrication. Unit is manufactured by Beardsley & Piper, Division of Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39.

For More Details Circle No. 43—Page 319



New Model M-WC Water-Cooled
CENTRIFUGAL CASTING MACHINE

Write for Bulletin #153

The water-cooled Model M-WC centrifugal casting machine utilizes low-cost permanent molds, producing gray cast iron cylinder liners, bushings, etc., at a high rate. With water-cooled metal molds it is possible to produce gray, machineable cast iron using ordinary metal analyses. This is accomplished easily in the water-cooled Model M-WC because mold temperature can be maintained at any high or low temperature merely by controlling the amount of water used for cooling. Use of a properly applied refractory wash and a hot mold permits facile production of completely gray cast iron bushings, even at the ends.

Model M-WC is also ideal for either high or limited production of bronze bushings, with the same advantages of low-cost molds and ease of changing molds.

FEATURES

- **Low mold cost for either cast iron or bronze castings.**
- **High production—only one mold necessary.**
- **Simple, sturdy equipment—practically no maintenance.**
- **Quick changeover from one mold size to another.**
- **Rapid initial production as molds are made from available steel tubing—eliminating pattern expense and delay for casting of molds.**
- **Very small floor space required.**
- **Machine completely guarded and safe for workmen.**
- **Only unskilled labor required.**
- **Mold operating temperature easily controlled.**

RESEARCH FACILITIES

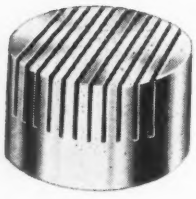
We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal casting at low cost.

CENTRIFUGAL CASTING MACHINE COMPANY

P. O. BOX 947 TULSA 1, OKLAHOMA

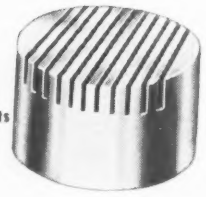
PRODUCE GRAY CAST IRON CYLINDER LINERS AND BRONZE BUSHINGS RAPIDLY AND AT LOW COST BY CENTRIFUGAL CASTING

SMILLIE
CORE BOX VENTS
"A Specific Type for Every Core Box"
Slotted



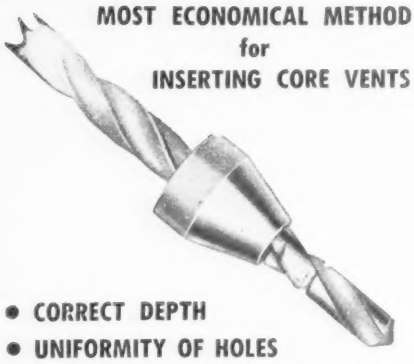
X-TRA DEEP HEAD
.156
Wide Slots
.014

DEEP HEAD
.093
Wide or Narrow Slots
.014 .010



SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

INSERTING DRILL
MOST ECONOMICAL METHOD
for
INSERTING CORE VENTS



- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT

VENT CLEANER
FOR CLEANING SLOTS
- MADE OF TEMPERED STEEL
- EASY TO USE

MANUFACTURERS OF PRECISION TOOLS GAGES FIXTURES MACHINED-GROUND PARTS

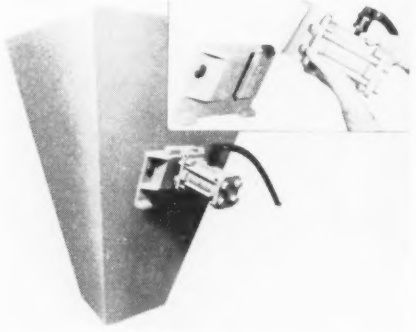
C.M. SMILLIE & CO.
1124 WOODWARD HGTS., FERNDALE 20, MICH.

(*Continued from page* 332)

tem. The pressure switch, connected to warning lights, permits ready identification of too high or too low pressure, blocked lines and low oil supply, or it will shut down the machine being lubricated.

For More Details Circle No. 44—Page 319

Air Vibrator: Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland—A 2-in. piston diameter air vibrator is said to provide a practical



means of eliminating arching, bridging and sticking conditions in bins, hoppers, chutes, flasks, mining cars and other equipment handling granular materials. The unit is quickly and easily portable. A cast steel male bracket on it fits snugly into the female bracket and steps up the unloading of materials that tend to pack down. The unit is said to start and stop instantaneously and is ideal on applications where one vibrator can serve several bins by moving it from one to the other. It is 5 x 5½ x 10 in. and weighs 30 lb.

For More Details Circle No. 45—Page 319

Car Loading Ramp: Penco Engineering Co., 25 California St., San Francisco 11—Flared car loading ramp made of magnesium can be transported, placed in position and removed by one man. It incorporates a full-range positive locking device. Constructed of heavy duty diamond plate, it is nonskidding and crowned for different levels. Beveled edges afford "no-jar" activity of materials handling equipment. Sixty inches wide at car door end and 84 in. wide at dock end, it is made in 52 standard models in capacities of 3000, 6000, 8000 and 10,000 lb. Its use is said to require no installation expense.

For More Details Circle No. 46—Page 319

Cylinders and Valves: Mead Specialties Co., Dept. CV-8, 4114 North Knox Ave., Chicago 41—Company has added three new air clamps (spring return air cylinders and two new air valves) to its line of air-

PARA-PRODUCTS
For Better Castings MORE PROFITS

PARASPRAY
CORE AND MOLD SURFACE CONDITIONER

SUPER PARACOAT
RUBBER PATTERN FINISH

ROYAL PARACOAT
PLASTIC COATING FOR PLASTER & GYPSUM MOLDS

BONISPRAY
PERMANENT MOLD AND DIE DRESSING

ANTI-FLAME
FLAMEPROOFS BOTTOM BOARDS & WOOD FLASKS

PARAPLY
SUPERIOR, MODERN REPLACEMENT FOR SHELLAC

PARASOLV
MULTI-PURPOSE THINNER AND CLEANER

PARACRETE
RUBBER PAINT FOR FOUNDRY MAINTENANCE

PARAPRIME
RUBBERIZED RED LEAD PRIMER

PARAZERV
WOOD PRESERVATIVE STAINS

SEND FOR NEW CATALOG TODAY

FOUNDRY RUBBER INC.
6100 RIVER RD., WASHINGTON 16, D.C.
PHONE—OLIVER 4-1022

operated cylinders. The air cylinders have a power factor seven times line pressure and a 3-in. bore. Their strokes are 1, 2 and 3 in. One of the new valves has a button mounted directly on the valve plunger in place of a lever. The button is actuated by the operator's palm or fist. Openings are full 5/16 in. throughout, and hose nipples fit ⅜-in. ID hose. Another model fits ¼-in. hose. With 1000-psi air line pressure, a force of about 10 lb is required to push the button.

For More Details Circle No. 47—Page 319

Circulation Heaters: Edwin L. Wiegand Co., 7596 Thomas Blvd., Pittsburgh 8 — Electric circulation heaters, attached to engine blocks with angle iron, keep diesel engines ready to operate in cold weather safely and automatically. With flexible connections to the cooling systems, regular types of antifreeze are circulated by natural convection through the heater and the engine block, warming the engine. Special pumps are not required. The heater is a completely "packaged" unit with built-in elements, heating chamber, thermostat and threaded inlet and outlet. On average mornings, a 150°F setting is sufficient to heat most engines in half an hour. In colder weather, the heaters can be run all night at 90°F.

For More Details Circle No. 48—Page 319

Slat Conveyor: Sage Equipment Co., 31 Essex St., Buffalo 13—Slat conveyor for handling hot castings and other heavy, bulky products pushes material with bars clamped

to the pair of power-driven chains traveling in the side rails of the conveyor frame. Located at 48-in. centers, these bars push the material over a stationary, full-width roller bed. Both ends of the roller are equipped with lifelong lubricated bearings that roll in a case-hardened raceway. The entire ball bearing housing is pushed into the end of the roller and

(*Continued on page* 338)

pick up your phone in LARGE CITIES... SMALL TOWNS... CROSS ROADS...

. . . or wherever metals are cast for fast "near-as-your-telephone-service" on the basic foundry commodities listed below.

GRIT	PIG IRON	FERROPHOSPHORUS
SHOT	DOLOMITE	REFRACTORIES
COKE	LIMESTONE	SAJCO JACKETS
COAL	FLUORSPAR	CUPOLA BED LIGHTER
CLAYS	SPIEGELEISEN	
SANDS	SILVERY IRON	BONDACTOR

REMEMBER:
ONE CALL GETS THEM ALL!

Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

After years of research **CASTFLUX** *announces the successful development of*

CASTFLUX
Trade Mark Reg.

M-I-D

CASTFLUX
Trade Mark Reg

SB-10 the 'national' DUAL PURPOSE FLUX

IN THE LADLE . . . SB-10 increases fluidity materially by cleansing and purifying the metal, bringing to the surface occluded oxides, gases, slag, dirt, etc., offsetting the negative factors of inferior scrap and coke.

AS A 'HOT TOPPING' . . . SB-10 prevents oxidation by keeping molten steel down into the main body of the ingot, greatly reducing volume of piping and saving a substantial amount of metal. There is no carbon segregation or pickup.

ON BLIND AND OPEN RISERS . . . SB-10 raises the temperature of the metal to a higher degree and substantially increases and maintains the fluidity of the metal during the entire cooling-down period.

Selling Agents and Distributors of Castflux:

St. Louis, Mo.
M. A. BELL CO.
with Branches in Houston, Texas and Denver, Colo.

Vancouver, B.C., Canada
INDUSTRIAL SUPPLIES LTD.

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Dayton, Ohio
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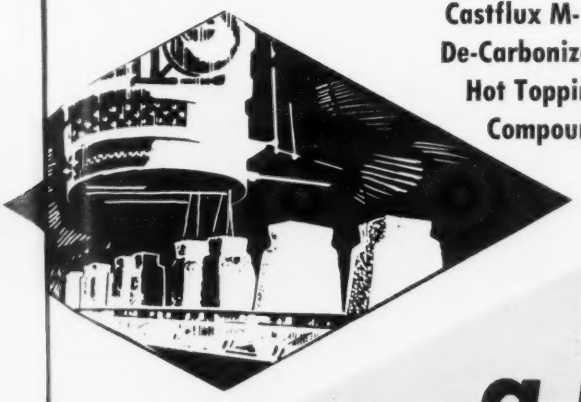
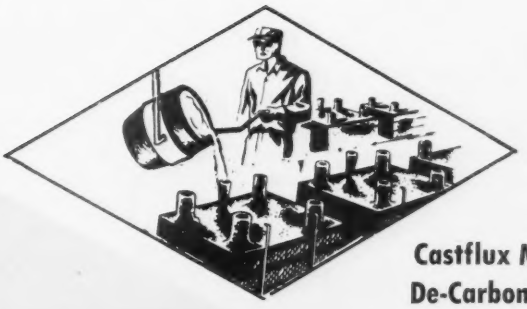
CASTFLUX **NATIONAL pigment ccc.**



Castflux M-10
De-Carbonized
Hot Topping
Compound



Castflux M-10
De-Carbonized
Riser Compound

a new DE-CARBONIZED* COMPOUND

HOT TOPPING AND RISER

used on
steel and malleable
castings
and ingots

Years of laboratory research and months of actual field testing have proven the superiority of CASTFLUX M-10 over most hot topping or riser compounds on the market today. The less than 3% carbon content of M-10 once and for all precludes any carbon pickup, segregation or contamination in any steel or steel alloys, and permits the control of carbon content in your metal without variation.

Depending on the size of the head, various tests have shown as much as 25% reduction in the depth of the piping, resulting in more solid metal in your ingot.

CASTFLUX M-10 will feed more riser metal into the main body of the casting and materially reduce any undesirable shrink, both internal and over-all.

As a ladle covering, CASTFLUX M-10 retains the pouring temperatures of the metal for a far longer period, thus permitting short pouring, and substantial saving of remelt metal.

DE-CARBONIZED CASTFLUX M-10 with all the improvements and the many advantages is still only priced the same as CASTFLUX SB-10.

That DE-CARBONIZED CASTFLUX M-10 will increase the yield and improve production at considerable savings has been conclusively proven. You, too, will benefit by a test-trial.

unconditionally GUARANTEED

Unless Castflux meets with your full approval, material can be returned at no expense within 30 days.

** less than 3% carbon content*

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(*Continued from page* 335)

is held in position by a spring lock that provides quick, easy assembly and disassembly. Friction is reduced by the free turning ball bearing rollers. These conveyors are available in a wide range of widths and frame pitches. They are chain-driven from a special reducer by an air-cooled motor.

For More Details Circle No. 49—Page 319

Clamp: Centinela Industrial Supply Co., 11930 Inglewood Ave., Hawthorne, Calif.—Clamp with a capacity range of from 3 to 12 in. is made of alloys which assertedly reduce weight 65 per cent without decreasing strength. Action of the cantilever jaws is said to eliminate damage from wracking stress and to insure long "true action" life. Screw and head are fabricated from one-piece alloy steel and completely supported at both ends. The 1-in. square head features a right angle drilled hole for speed of quick-spin adjustments. Manufacturer says that the torque-converting, spring-bearing trunnion completely ends the distorting, twisting action that occurs in many methods of clamping and that the trunnion also absorbs vibration, insuring a firm, steady grip.

For More Details Circle No. 50—Page 319

Automatic Dump Box: Palmer-Shile Co., 16000 Fullerton Ave., Detroit 27—Automatic dump box for handling all types of materials or

parts may be used with any hand or power lift or fork truck or for pickup and moving by overhead hoist. Gravity latch locks box in upright position until operator pulls the latch and releases the box, which is automatically dumped. Built of heavy gage steel, with reinforcing flange all around the top edge, the box measures 24 x 36 x 48 in. inside. It has heavy angle legs, corner reinforcements and heavy side reinforcing plates at the location of the trunnion. Overall height from floor to hoist hook (with 12-in. legs) is 64 in. With 10-in. legs, it is 60 in.

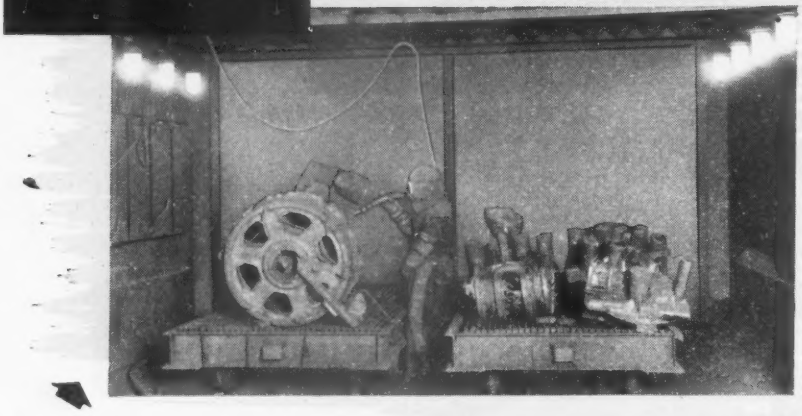
For More Details Circle No. 51—Page 319

Hydraulic Cylinders: S-P Mfg. Corp., 12415 Euclid Ave., Cleveland 6—High-pressure hydraulic cylinders constructed entirely of steel are designed for working pressures up to 2000 psi. Rolled steel is employed for end plates and mountings. Eleven different models comprise the line, each available in 11 bore sizes from 1½ in. through 8 in. Bronze "quick-change" packing cartridge can be taken out for servicing by removing a snap ring. These cylinders are engineered throughout in compliance with JIC standards.

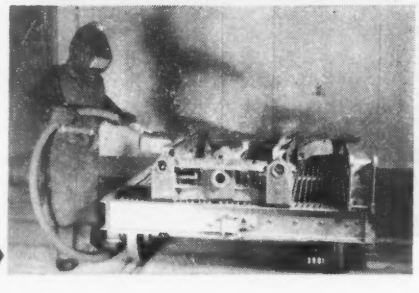
For More Details Circle No. 52—Page 319

Painting Machine: Conforming Matrix Corp., 348 Factories Bldg., Toledo 2, O.—Automatic single-spindle painting machine for short runs is being produced as portable "pack-

SLY ARMOURED* BLAST ROOMS



A 16′ x 16′ Sly Blast Room with double track for two cars. Both cars can be used for a single large casting. Note how perforated floor plates keep coarse refuse from entering hopper below.



This view shows a Sly Blast Car in a Sly Blast Room. Perforated floor plates are supported by grating preventing plates from warping. Observe how tops of rails are flush with floor. Operator wears a Sly "Purair" Helmet.

Whatever Size Your Castings

And whatever your tonnage we have a standard blast room to suit. We have built blast room equipment for the cleaning of the inside of tank cars, for large airplane fuselages, for structural assemblies, tanks, railroad cars and locomotives. Some large blast rooms are self-contained buildings.

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Inside width: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft. • Inside Length: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft. Inside Height: 7 ft. 3 in., 8 ft. 3 in., 9 ft. 3 in. • Larger Blast Rooms for special purposes.

*ARMOURED — An extra layer of detachable 3/16″ steel wear plates to protect the walls. • An extra layer of steel grating to reinforce the floor against sagging. (Exclusive Sly features)

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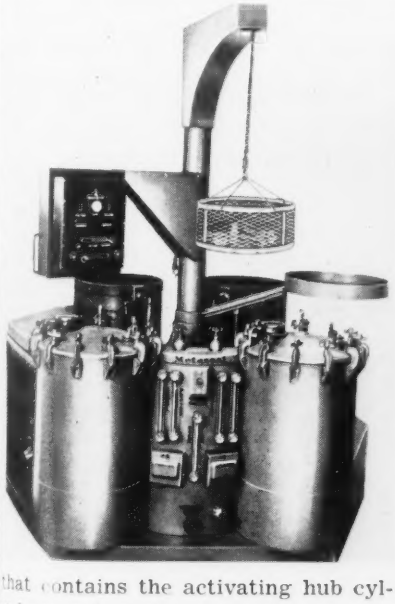
age" equipment for use in most standard spray exhaust booths. One dial regulates spindle speed from 100 to 400 rpm, and a second dial controls length of time the spray guns operate. Spindle and guns go into action at the touch of a foot pedal, but stop automatically as predetermined by the dial settings. Speed of operation is dependent upon loading time required. Up to four guns can be mounted, one in each corner, to cover the work. The work-holder is designed to serve as a masking device when necessary.

For More Details Circle No. 53—Page 319

Dial Indicator: Homestrand Inc., Larchmont, N. Y.—Swedish-made dial indicator, adaptable for use with any height gage, is designed for use in inspection departments. It reportedly is easy to attach to indicator stands, to machines for indicating work being set up and to completed machine parts. It is furnished with a slitted ball to facilitate setting of the indicator in a chuck. A lever on the side of the body reverses direction of movement of the contact point, which is equipped with a joint to permit it to be set anywhere within a range of plus or minus 90 degrees. The dial is graduated in thousandths with a range of plus or minus 0.015. For easy reading, half the dial is in red.

For More Details Circle No. 54—Page 319

Casting Impregnation: American Metaseal Mfg. Corp., 30 East 60th St., New York 22—Casting impregnation machine for one-man operation is built around a center hub



that contains the activating hub cylinders and mechanizes all functions of the machine, from basket loading through the vacuum-pressure cycle and the cleaning surge. Completely self-contained, the unit is built on its own platform. Cleaning agent is

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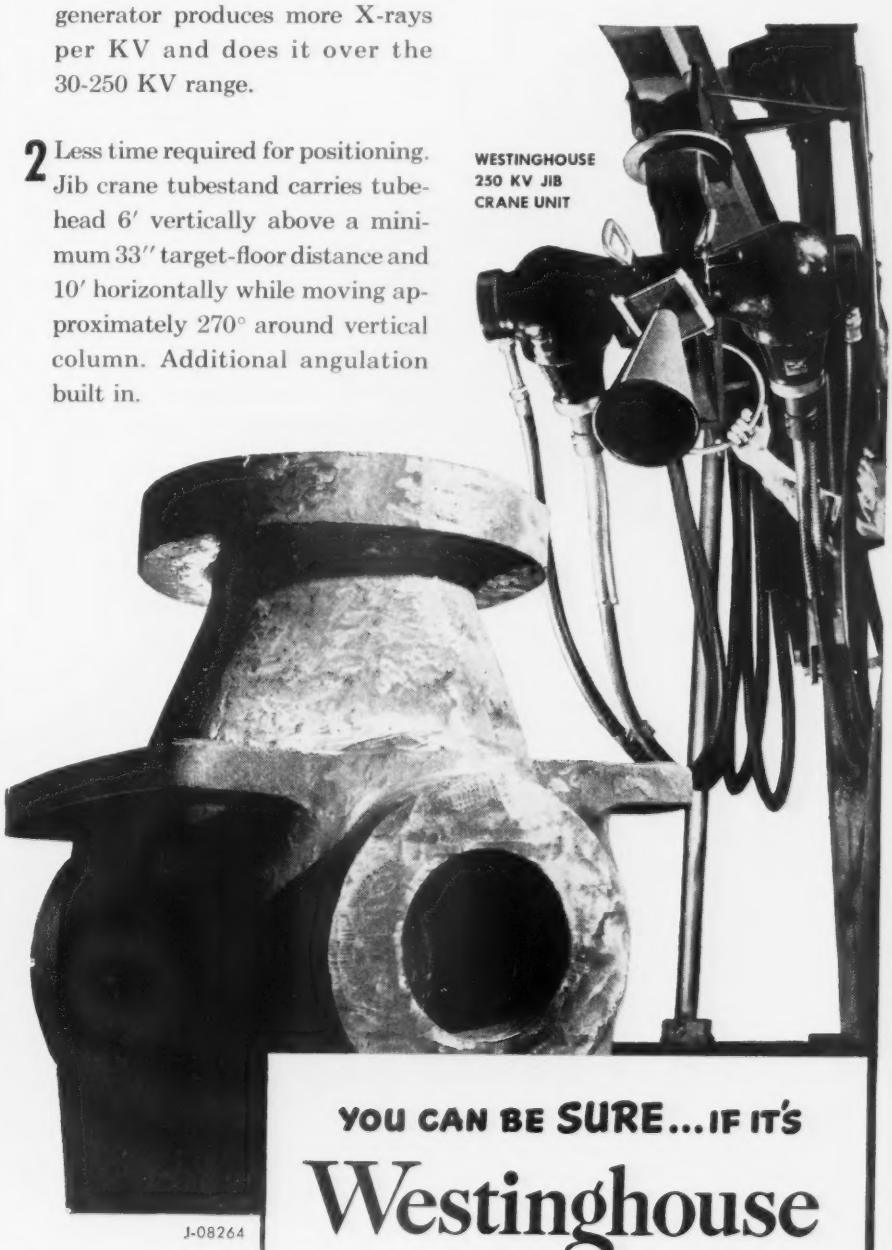

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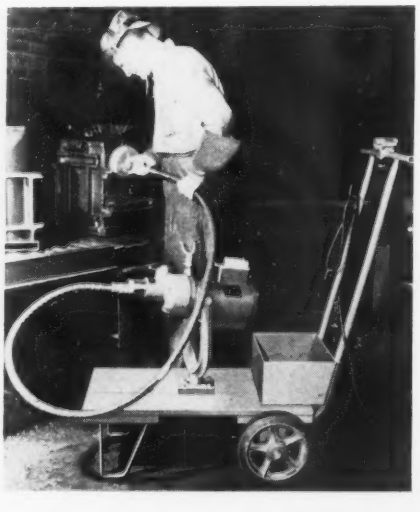
noninflammable and nontoxic. Company claims that its impregnating resin, which requires no solvents or other volatile matter, achieves 100 per cent sealing of microporosity on a permanent basis. The resin flows into pores under vacuum and pressure; then heating the castings polymerizes the resin into a hard, infusible material. Resin does not require refrigeration, agitation or aeration. It is stable with all alloys.

For More Details Circle No. 55—Page 319

Sand Controller: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Sand controller embodies three units. The first adds the correct amount of water to each batch of sand, compensating for evaporation due to hot sand. Provisions for base water or clay slurry also have been made. Automatic sand mixing is provided by a second unit used in conjunction with the first. A third unit may be added to refine moisture control on the basis of working properties of the sand. This unit provides a continuous record of tests for green strength and green permeability. Deformation and moisture are controlled at the optimum point.

For More Details Circle No. 56—Page 319

Truck Mount: Franklin Balmar Corp., N. A. Strand Division, Woodberry, Baltimore 11—Portable truck mount for the company's line of flexible shaft machines consists of a hand truck with front skids and



wheeled rear axle. It is designed to combine portability with elimination of possible damage caused by pulling the machine by the flexible shaft. Unit itself is mounted on the deck of the truck so that one operator easily can push the unit from place to place. Handle of the mount is equipped with a clamp that holds the handpiece and tool of the flexible shaft unit, enabling the equipment to

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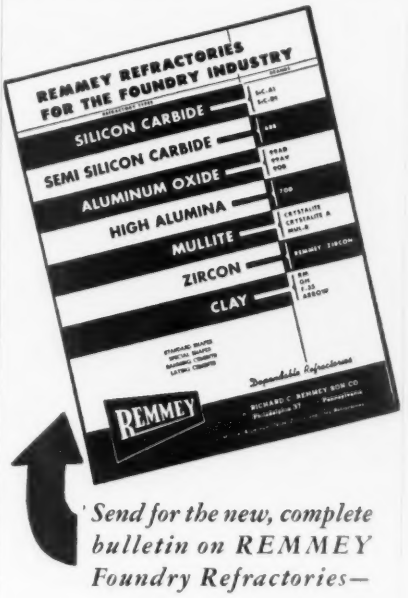

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be used as either a fixed or portable tool. Power unit for the flexible shaft machine is mounted in a yoke which provides a turning radius of 360 degrees.

For More Details Circle No. 57—Page 319

Black Light: Ultra-Violet Products Inc., 145 Pasadena Ave., South Pasadena, Calif.—One hundred watt, long wave, ultraviolet hand lamp operating on 110-v ac throws a directional beam of long wave (3660 AU)

ultraviolet up to 30 ft. It will clamp rigidly to its nontip base (containing transformer) and can be locked permanently to any position desired. Unit has easily gripped, plastic handle; heavy, three-conductor primary and secondary cords and is designed to burn cooler, assuring longer bulb life. Radiation is said to be noninjurious. It can be used to detect oil leaks or, in combination with invisible fluorescent inks, dyes or powders, to determine flaws, adulteration, decay, contamination or the improper coverage of protective coatings.

For More Details Circle No. 58—Page 319

Cable Connector: Bernard Welding Equipment Co., 10222 Avenue N, Chicago 17 — Combination cable connector provides for attaching welding cable to electrode holder by a ½-in. diam fine thread socket screw, by soldering or by a combination of both methods. The screw, which affords a large contact area, is tightened in seconds with a hex key wrench that can be inserted through a hole in the fiber handle of the holder. Holder need not be disassembled.

For More Details Circle No. 59—Page 319

Dusting Concrete Floors: United Laboratories Inc., 16801 Euclid Ave., Cleveland 12—Product for control of dusting concrete floors is claimed to bind together tiny dust particles that are actually a part of

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1930— First commercial use of gamma rays; radiograph made of sternpost of cruiser "Chester".

1935— First purchase of radium for industrial radiography by Westinghouse; bought from Radium Chemical Co., Inc.

1938— AFA questionnaire revealed that 6% of steel casting men used radium radiography.

1941— 22% of steel casting men bought, rented, leased or employed radium for radiographic purposes.

1946— 150 steel foundries rented or leased radium.

1947— American Society for Testing Materials issued Radiographic Standards for Steel Castings. (Gamma Ray). E71-47T.

1948— 200 steel foundries rented or leased radium.

1949— Revision of the U. S. Navy Universal Exposure Calculator for Radium Radiography by N. A. Kahn, E. A. Imbembo and J. Bland, New York Naval Shipyard, Brooklyn, N. Y.

1950— 250 steel foundries rented or leased radium.

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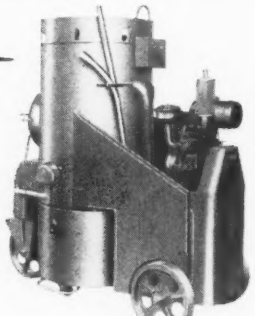

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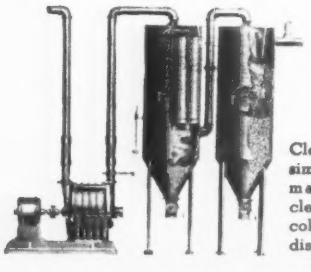

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the concrete surface and are the first sign of surface disintegration. Applied by brush or mop, the product is a thin, light amber liquid that penetrates pores deeply but does not alter surface appearance or form a surface film. It can be applied to either newly laid or old concrete or to wooden floors, to stop the surface from splintering.

For More Details Circle No. 60—Page 319

Automatic Couplers: Towmotor Corp., 1226 East 152nd St., Cleveland 10—Three types of automatic couplers have been added to optional original equipment available on the company's lift trucks

and tractors. Installed as replacements for standard towing eyes, these couplers are said to speed the pickup and release of trailers used with the power units. Each type is built with an open jaw that automatically makes the connection when it is entered by the trailer coupler. One type provides a hand-operated release lever, another employs a foot lever, and a third permits operation of the release mechanism either manually or by foot pressure. Two of the couplers are spring actuated, and the other utilizes a ball-type lock.

For More Details Circle No. 61—Page 319

Fire Extinguishers: Walter Kidde & Co., 675 Main St., Belleville 9, N. J.—Portable carbon dioxide fire extinguishers feature squeeze type valves and come in five sizes: 2½, 5, 10, 15 and 20-lb models. They use lightweight cylinders, and the squeeze type valve requires only normal hand pressure to actuate the extinguisher after the safety pin has been removed. Recharging is accomplished by squeezing the valve open to permit the recharge gas to enter the cylinder. Carbon dioxide is approved for use on Class B (inflammable liquid) and

Class C (electrical equipment fires) and does not require any cleaning up. These extinguishers have been approved by Underwriters' laboratories and the Factory Mutual Laboratory.

For More Details Circle No. 62—Page 319

Lamp Reflector: Abolite Lighting Division, Jones Metal Products Co., West Lafayette, O.—Light reflector that screws directly into any standard light socket eliminates danger of short circuit from accidental breakage of lamps and the possibility of crossing and arcing broken lamp wires. Lamp screws into the reflector, which in turn screws into the light socket. Inside surface of reflector is finished in titanium white porcelain enamel. Outside surface is finished in cream-colored porcelain. Available in 10 or 12-in. diam, the reflector is 3 in. deep.

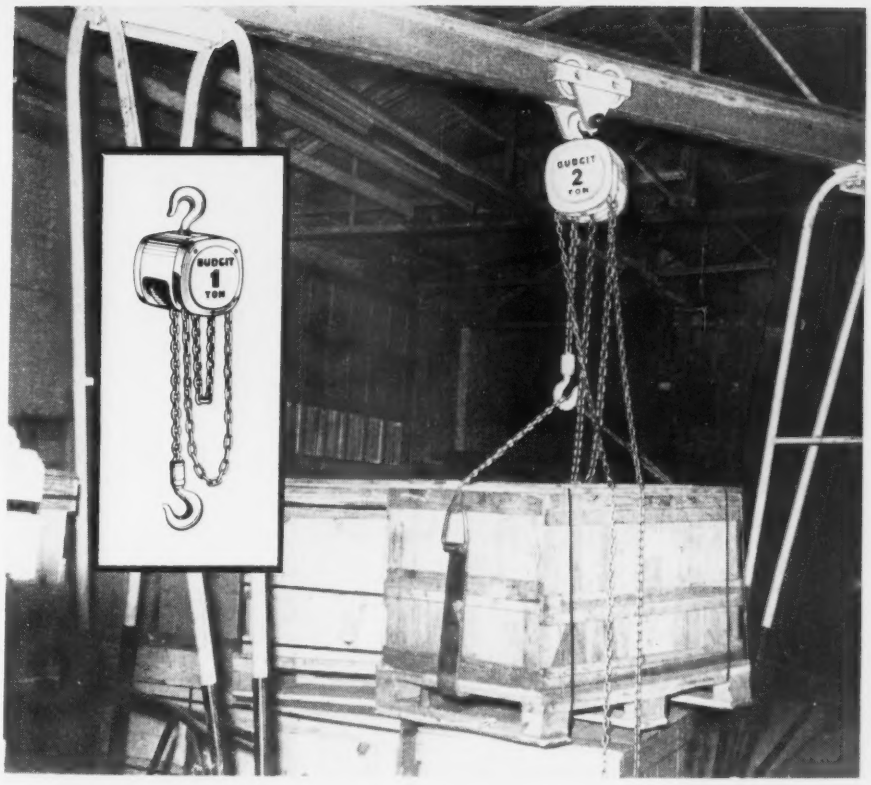
For More Details Circle No. 63—Page 319

Motor Reducer: Reuland Electric Co., Alhambra, Calif.—Fluid shaft motor reducer with individual deceleration and holding brakes consists of a magnetic brake, motor with internal fluid coupling, second magnetic brake and gear reducer. It provides smooth acceleration and deceleration, yet permits a completely stationary holding action at any point. Operating sequence is as follows: Energized motor transmits power to the load through the fluid coupling; after travel, the load is decelerated through the fluid coupling by magnetic brake mounted on the armature; at this point load can be held stationary by application of second brake mounted between coupling and gear reducer (latter brake also can be used for braking when load is still in motion.)

For More Details Circle No. 64—Page 319

Suspension Furnaces: Jackson & Church Co., Saginaw, Mich.—Three new suspension units have been added to the company's line of warm air furnaces. Smaller than any previously manufactured by the firm, they produce 80,000, 100,000 and 112,000 Btu. They can be arranged singly or in batteries and are especially suitable for installations where floor space is at a premium. They can be adapted to summer air conditioning by tying them in with refrigeration units. Lengths are 55, 58 and 61 in., respectively, and all are 23 in. high and just over 26 in. wide. They use a 9-in. blower and 1/6-hp motor, a 9-in. blower and a ¼-hp motor and a 10-in blower and a ¼-hp motor, respectively. All incorporate the firm's heat exchanger system.

For More Details Circle No. 65—Page 319



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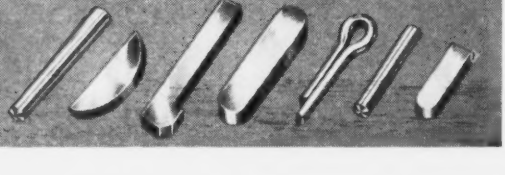

ASTM Spring Meeting Held in Detroit

Nearly 1100 attended the 300 meetings of the American Society for Testing Materials' technical groups during its annual Spring Committee Week in Detroit, Mar. 2-6.

At the meeting of Committee A-3 on Cast Iron, the increasing interest in use of cast iron for applications at very low temperatures resulted in a move to organize an investigation of the problem with a view toward preparing suitable specifications. The committee also expects to contribute to the symposium on "Low Temperature Properties of Materials" which is to be held in June at Atlantic City, N. J.

Subcommittee on Nodular Iron discussed proposals to establish specifications at strength levels of 60,000, 90,000 and 120,000 psi. Committee A-3 is revising specification A 159 for Automotive Gray Iron Castings to permit higher sulphur contents resulting from use of currently available materials. Subcommittee on Cast Iron Soil Pipe has undertaken the modification of existing specifications to accommodate lighter weight pipe and standardize dimensions to permit interchangeability. Application of cast iron to elevated temperatures will be studied under the auspices of the Joint Committee (ASTM-ASME) on the Effect of Temperature Upon Metals.

Committee A-7 on Malleable Iron Castings received a report of investigations into the impact properties of malleable iron at both elevated and subzero temperatures which indicated excellent retention of characteristic room-temperature properties. This information probably will be made available during the low-temperature symposium to be held in June. Further study of impact behavior is planned. Action was taken by Committee A-7 toward adoption as standard of the Tentative Specifications for Pearlitic Malleable Iron Castings (A 220-50). It decided to continue in its present status the tentative specifications for malleable iron flanges, pipe fittings, and valve parts for railroad, marine and other heavy duty service (A 338-51T).

Committee E-4 on Metallography has arranged a symposium on electron microscope techniques for the Atlantic City meeting, and Subcommittee XI on Electron Microstructure of Steel will publish its third progress report. Committee E-10 on Radioactive Isotopes will sponsor a symposium on use of those materials in industry, and papers will cover properties and uses of radioactive isotopes.

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possible applications in ASTM work; laboratory design, health, safety, and personnel training; instrumentation; management's view of radioactivity, and AEC film on methodology.

Committee A-1 on Steel held its meeting in February at Birmingham, and made a change in specification A 217-49T on Alloy Steel Castings for Pressure Containing Parts Suitable for High-temperature Service. This consisted of the addition of a 1.25 per cent Cr, 0.50 per cent Mo, 0.20 per cent V steel with tensile properties similar to the present grades WC4, WC5, WC6 and WC9. An identification symbol has not yet been established for the new composition.

University of Michigan Plans Foundry Course

The College of Engineering of the University of Michigan, Ann Arbor, Mich., will offer a course in Advanced Cast Metals Practice Aug. 10-19. Designed as an intensive summer session for men in industry who have only a limited period available for study, the course will provide the equivalent of a semester of work. Mornings will be devoted to lectures and problem sessions, afternoons to work and observation in the foundry laboratory.

Enrollment is limited to approximately 25. The course will be divided into three principal parts: The physical characteristics of liquid metals, the chemical characteristics and new materials and methods. The first two parts assume a working knowledge of elementary chemistry and physics.

A fee of $150 covers text and all laboratory expense, but not lodging and meals. Registration must be completed before June 3. Rooms have been allocated at the Michigan Union Aug. 9-19, and space can be reserved at the Union, 530 South State St., Ann Arbor.

All correspondence should be addressed to Richard A. Flinn, 4305 East Engineering Building, Ann Arbor, Mich.

AMA Issues Pamphlets

American Management Association, 330 West 42nd St., New York 36, has published two new pamphlets priced at $1.25 each. In the manufacturing management series, booklet 200 deals with "New Solutions to Production Problems," and booklet 201 with "Organizing for Defense Production," combined with "Relieving the Engineering Shortage."

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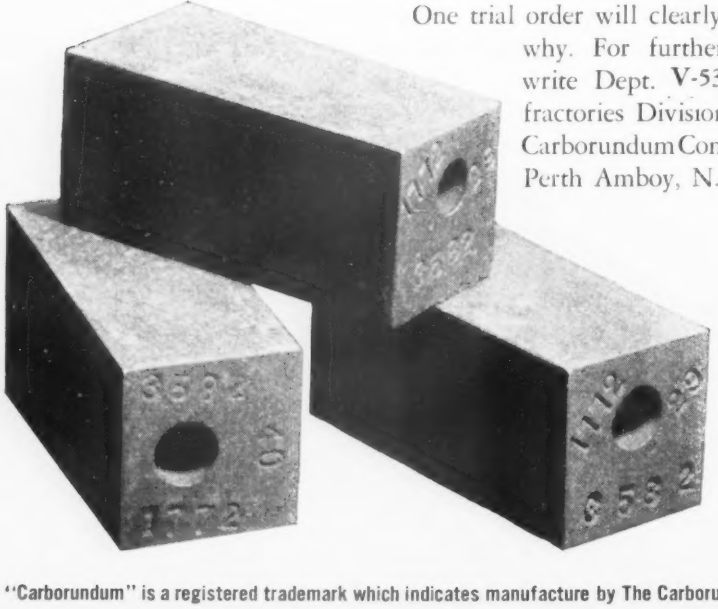

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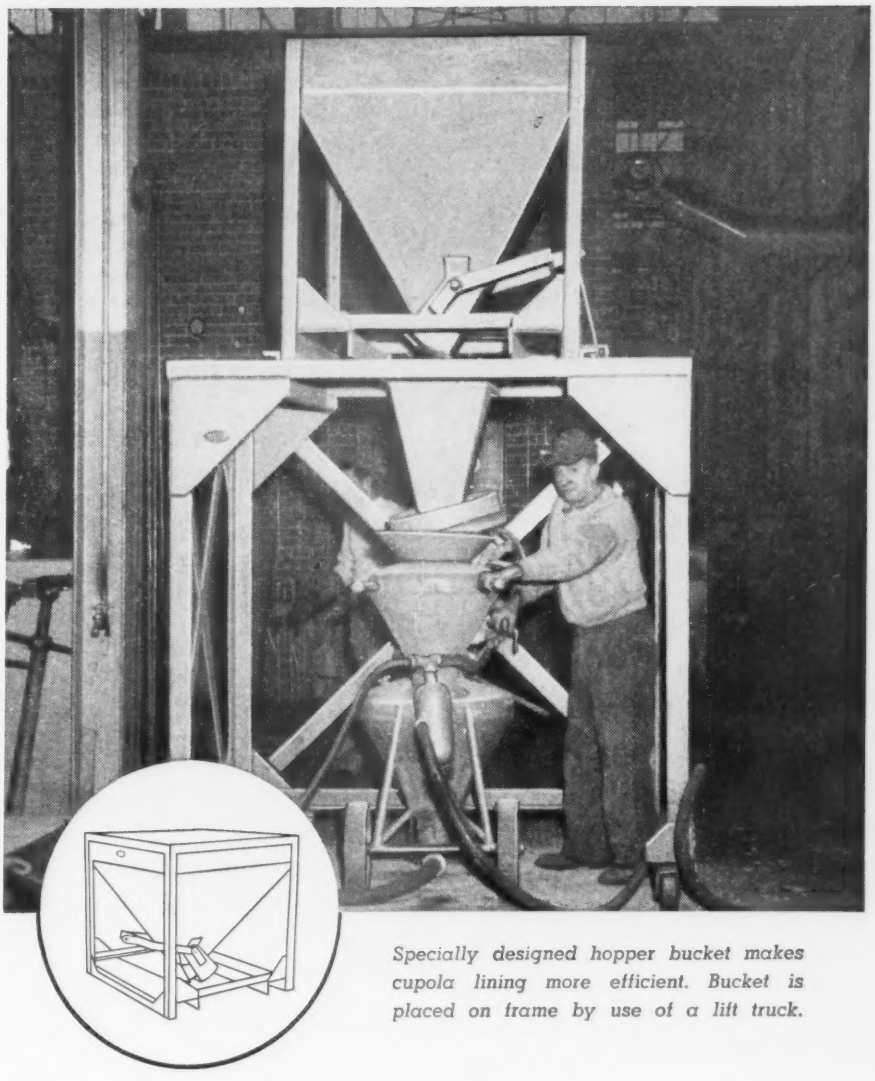

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Foundry Panel on SAE Meeting Program

The National Production Meeting and Forum of the Society of Automotive Engineers Inc. met in Cleveland Mar. 25-27 at the Hotel Statler to give manufacturing men a look at the problems they will face in the future and at the tools they will use to cope with new production developments. Paul A. Miller, Leece-Neville Co., Cleveland, was general chairman.

Eight separate, informal gatherings on Wednesday, Mar. 25, discussed production problems and solutions in foundry work, grinding and cutting, quality control, materials handling, production control, preventive maintenance, forging, and progressive assembly techniques and methods. At each of these meetings, a panel of experts in the respective field answered the audience's questions and shared information and experiences.

Members of the foundry panel were E. C. Jeter, plant manager, Ford Motor Co., Cleveland, panel leader; Alex Barczak, works manager, Superior Foundry Inc., Cleveland; Al Hinton, plant manager, Cleveland Sand Foundry, Aluminum Co. of America; Frank O'Malley, manager of industrial relations, Ferro Machine & Foundry Inc.; F. J. Pfarr, plant manager, Lake City Malleable Co.; William Phillips, sales manager, Crucible Steel Casting Co., and J. A. Stirling, supervisor of training section, Ford Motor Co., Cleveland, panel secretary.

Various subjects came up for discussion, including the reduction of wall thicknesses of engine blocks and heads, the value of shell molding, the use of plaster molds when close dimensional tolerances are necessary and many other aspects of foundry practice.

One question arose at each of the panel's two sessions and excited more comment than any other. It concerned the great need for much more extensive co-operation between design engineers, procurement agents and foundrymen. Such co-operation, the panel stressed, would mean cheaper, better castings for the customer and less difficulty, scrap and dissatisfaction for the foundry. Panel members agreed that the foundry not only should be informed completely about the casting that is desired, but preferably should be consulted even before the casting is designed. It was pointed out, however, that personnel problems make such co-operation difficult for both small foundries and for small firms using castings.

On Thursday and Friday the meeting was devoted to prepared papers pertaining to automotive production and to visits to the Ford Motor Co. and Cadillac Tank Plant.

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Material Handling Clinic To Be Held in New York

First in a series of "traveling clinics" on material handling scheduled for 1953 by the Material Handling Institute will take place June 10 at the Hotel Statler, New York, at the request of and in co-operation with the New York City and New Jersey Chapters, American Material Handling Society. Purpose of the traveling clinics is to develop a better understanding among users of the correct applications of material handling equipment to industry's most pressing problems.

Chapter members will be polled before the meeting to determine their most urgent problems, and the clinic will be divided into several separate panel discussions, meeting concur-

rently, according to general types of problems presented. Each panel will include a specialist in each general type of material handling activity, a moderator from the AMHS and a co-moderator from MHI.

Plans for a clinic in Boston are being discussed, but are not yet final. Other clinics may be held at Chicago, Pittsburgh and Philadelphia. Local AMHS chapters would co-operate in all instances.

Malleable Founders Make Self-Improvement Awards

Winners of the Malleable Founders' Society self-improvement award for 1952 are Richmond Malleable Castings Co., Richmond, Ind., in Group I, with under 100 employees; General Metals Corp. (Oakland Plant), Los Angeles, in Group II, with 100-200 employees; Marion Malleable Iron Works, Chicago Railway Equipment, Chicago, in Group III, with 200-400 employes; and Columbia Malleable Castings Corp., Columbia, Pa., in Group IV, with over 400 employees. The first two went through 1952 without a lost-time injury.

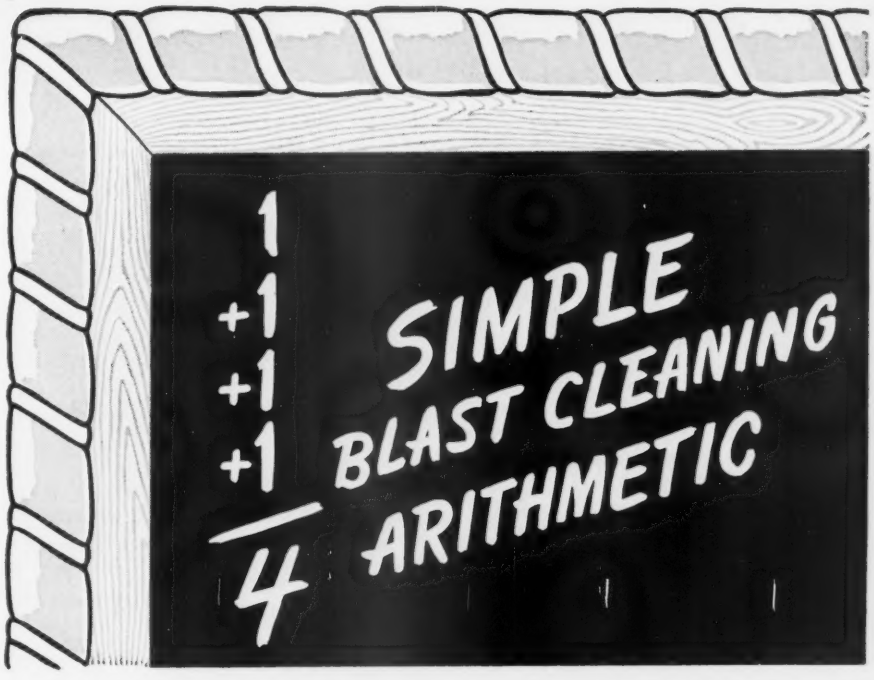
The award is made annually to plants that reduce their accident frequency rates the most from those of the previous year. Companies are divided into groups, as indicated, so that each competes with other plants its own size.

The accident frequency for the 61 companies participating in the contest was reduced to 29.7, 8 per cent below the 1951 figure. The society has announced that it also will issue a special award this year for the plant that goes the longest time without a lost-time injury.

Book Review

Proceedings of the Institute of British Foundrymen, cloth, 396 pages, 7⅛ x 9¾ in., published by the Institute of British Foundrymen, St. John Street Chambers, Deansgate, Manchester 3, England.

Contains 15 papers and two committee reports and discussions which were presented at the 1952 annual meeting of the Institute of British Foundrymen as well as 15 other papers and discussions delivered before the various branches of the institute. It also contains reports of officers, and other information on the annual general meeting. The presidential address by C. J. Dadswell and the Edward Williams' lecture on "Fuel and Metal" by Prof. R. J. Sarjant are included.



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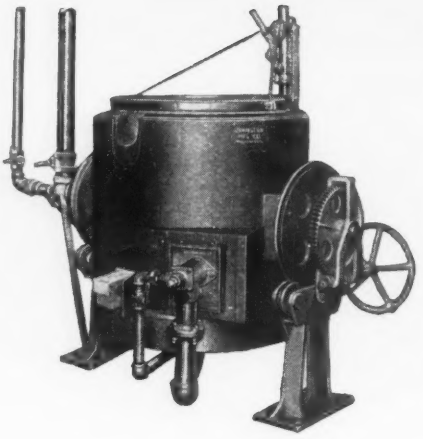

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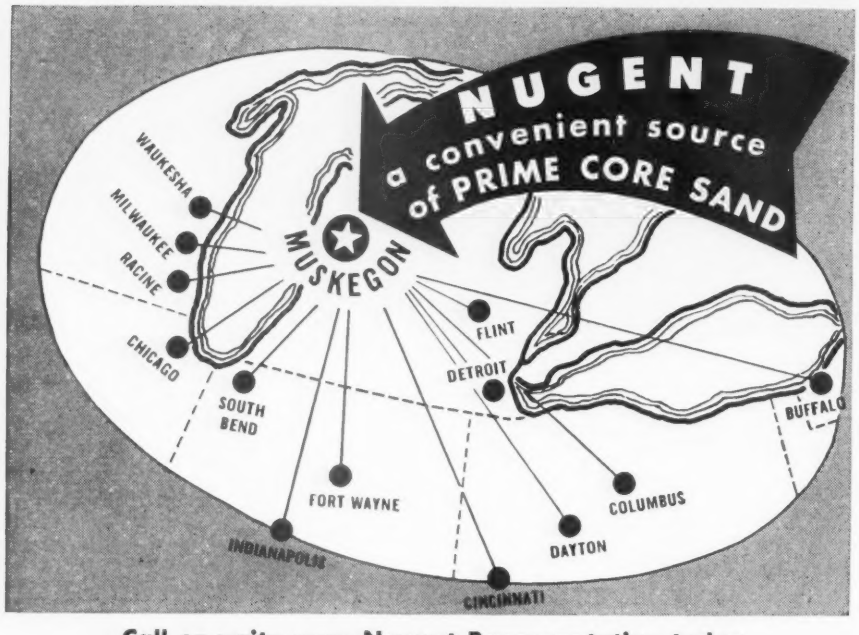

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1912 **CANNON** core sand 1953

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Progress in FEF Program

(*Continued from page* 198)

Lundberg recommended that the graduate in his new work attempt to be helpful without trying to show experienced operators how to run the foundry.

Among various duties applicable to the young engineer in a small foundry are physical and sand testing for control purposes; chemical analysis; heat treating, and experimental work on new processes. He also should keep informed on foundry developments and new ideas applicable to the company.

Mr. Dreher presided at the Thursday session, which was devoted to a discussion of educational activity by speakers from a number of the universities. Warren C. Jeffrey, University of Alabama, described some tests developed at the school for determining casting characteristics, including machineability, internal shrinkage and damping capacity. Slides showed some of the instruments developed for the various tests. The speaker also described the making of castings used in pieces of the student-made equipment.

C. C. Sigerfoos, Michigan State College, spoke on the college's practice of assigning juniors and seniors to work on problems in commercial foundries, equipment manufacturers' plants and in high schools. No credits toward a degree are allowed for such work nor is there any financial compensation. The program is intended to offer experience through practical application of classroom instruction.

Ashley Sinnet, Michigan State College, discussed his efforts in working with the Central Michigan Chapter of AFS in developing a high school foundry training program.

David Ekey, Pennsylvania State College, explained work with his students in using molten wax poured in molds to study effects of casting design, gating and risering on solidification. The development of hot spots, temperature gradients and other phenomena also can be studied.

D. S. Eppelsheimer, Missouri School of Mines, talked about baby cupolas, which he considers to be those of 8 in. or less inside diameter. They have an advantage for instructional work in that several of them can be used in a single class. He pointed to their use in the successful melting of brass and said that that metal presented fewer problems than gray iron.

Clyde McQuiston, Ohio State University, presented some thoughts on cost accounting, saying that the art

of making a profit depends to large extent on understanding cost problems. He believes it is essential for educational institutions to make students cost conscious and for foundries, when recent graduates are hired, to familiarize them with the practical aspects of cost determination.

L. F. Mondolfo, Illinois Institute of Technology, recommended the use of aluminum in school foundries because it illustrates practically all foundry uses and problems, and it is easy to test and x-ray. Furthermore, it is a little safer to use because of its lower melting temperature.

R. A. Flinn, University of Michigan, spoke of his school's formal teaching methods, research work and professional work. In his opinion, the important thing to get across to students is a realization of the things that are not known about foundry work. In that way they may be made to realize the need for their services and the opportunities existing for them in the industry.

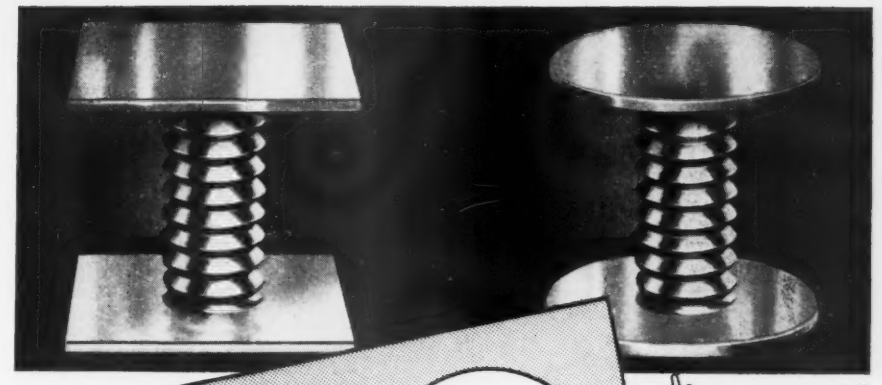
C. T. Marek, Purdue University, described the instruction program at Purdue and showed slides of the school's foundry laboratory and equipment. He talked of the dynamic foundry industry and of the need for inspiring students to great effort in addition to dwelling upon basic fundamentals which represent a minimum of knowledge.

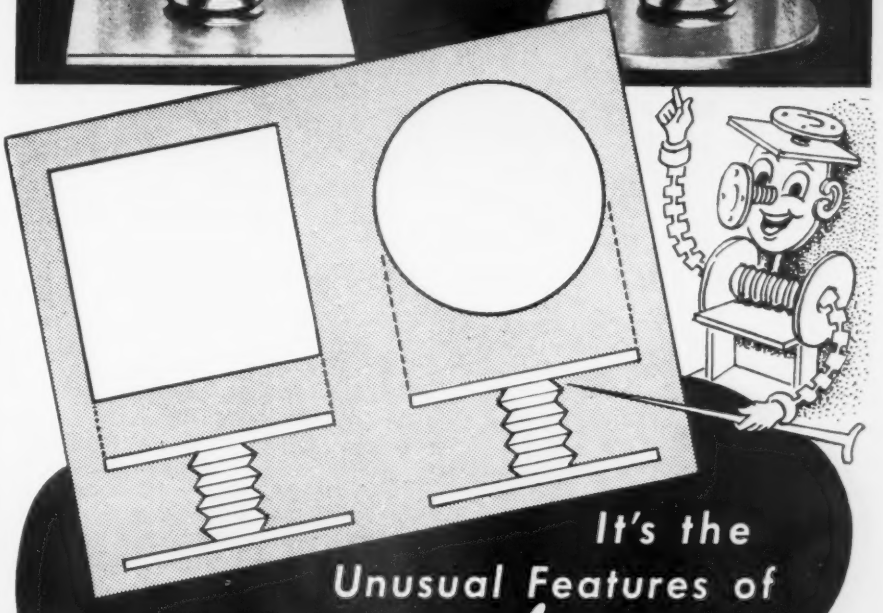
Clyde M. Adams, Massachusetts Institute of Technology, told about work he is doing on a book for foundry engineers. Its purposes are to provide a textbook for universities having no foundry laboratory or other foundry physical properties and to present as forcefully as possible the fact that foundry work is an engineering endeavor rather than an art.

A discussion panel under chairmanship of D. C. Williams, Ohio State University, discussed activities in "Attracting Students on the Campus." H. F. Taylor, MIT, pointed to the institute's attractive and well endowed laboratory plus the freedom of action permitted students to work on foundry projects. He called upon several students attending the conference to express their reasons for studying foundry work.

Fred Westermann, University of Cincinnati, indicated that the co-operative system of alternating classroom study and work periods in industry had an attraction value. "Co-op Day" and "Vocational Guidance Night" held at the university also are of value in helping students choose study courses.

Professor Sigerfoos pointed to the





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"Career Carnival" held at Michigan State College. Its purpose is to point out advantages of the various industries for which the college offers preparatory studies. Students thereby are helped in making their selection.

A summary of the conference was presented by Peter E. Kyle, Cornell University, who also made recommendations on the encouragement of students to study foundry engineering, on the planning of adequate curricula in the colleges and on selling commercial foundries on the advantages of using the talents of graduate foundry engineers.

At conclusion of the conference tribute was paid to Mr. Dreher for his work in the organization and development of the FEF by E. R. Shorey, University of Wisconsin, and Professor Taylor.

General Motors Institute Adds New Facilities

General Motors Institute, Flint, Mich., is adding a new building of 83,000 sq ft to the present structure, which will be remodeled. The new portion will add approximately 40 per cent to class room, laboratory and general service areas, for a total building area of 292,000 sq ft.

As a result of the expansion and the modernized facilities, enrollment in the co-operative programs at the institute can be increased to 2000 in 1954. This change will in turn result in a graduating class of 400 by 1956, compared to an average of 293 graduates a year since 1948.

Young men participating in these programs are qualified high school graduates who apply for an appointment by one of the General Motors divisions. Students divide their time between the plant and the institute for four years and eventually receive baccalaureate degrees.

Book Review

Transactions of American Society for Metals, cloth, 1152 pages, 6 x 9 in., published by American Society for Metals, 7301 Euclid Ave., Cleveland 3.

This is Vol. XLV of the American Society for Metals annually published work containing papers and discussions presented at its 1952 meeting. The book contains 48 papers by various authors on a wide range of topics. It also contains the 1952 Campbell Memorial lecture on "Microstructure" which was presented by C. S. Smith. Reports of officers as well as information on the program for the 1952 meeting also are included.

Trade Publications

For more details on these items use reply card—page 319

CONTROL INSTRUMENTS: Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Wayne & Windrim Aves., Philadelphia 44—Catalog 1530 comprises 56 pages describing the company's control instruments to measure and control a multiplicity of process variables. It contains detailed specification and control action descriptions and ratings for both electric and pneumatic type controllers and engineering data on electric control relays.

For More Details Circle No. 121—Page 319

CLUTCHES: Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich.— Folders illustrate a line of over-running, indexing and backstopping clutches made with full complement of sprags. It is said that this type of clutch gives the greatest torque capacity for size and weight. Application and engineering data are included.

For More Details Circle No. 122—Page 319

METALS CHART: Sam Tour & Co., 44 Trinity Place, New York 6—Metals chart shows the compositions of all metals and alloys commonly used in industry. It lists constituent elements and percentage composition ranges for 60 different classes or types of metals. Atomic number and specific gravity of each of the 48 elements commonly encountered in industrial metals are included. Size is 16 x 34 in.

For More Details Circle No. 123—Page 319

DIE METAL: Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.—Bulletin 41 concerns the use of Meehanite as a material for stamping and forming dies and shows many die applications in all types of industry. A sound slide film on the same subject is available in conjunction with the bulletin.

For More Details Circle No. 124—Page 319

BLAST CLEANING: American Wheelabrator & Equipment Co., 1102 South Byrkit St., Mishawaka, Ind.—Bulletin 904 shows how airless blast cleaning can cut finishing costs of all kinds of nonferrous castings. Illustrated case histories cover brass, bronze, aluminum and allied fields. Performance data are included.

For More Details Circle No. 125—Page 319

POWER DISTRIBUTION: General Electric Co., Schenectady 5, N. Y.—Bulletin GEA-5900 is a guide for plant engineers on electric power distribution practices in large and small plants. It covers utility distribution practices, methods of buying electric power, what to do when a choice of primary voltages is available, and allied subjects.

For More Details Circle No. 126—Page 319

POT FURNACES: Eclipse Fuel Engineering Co., Rockford, Ill.—Bulletin D-50 features technical data, including dimensions and specifications, concerning the company's rectangular and circular gas-fired salt pot furnaces for hardening and drawing operations with lead or heat treating salts.

For More Details Circle No. 127—Page 319

DESULPHURIZING METAL: Solvay Process Division, Allied Chemical & Dye Corp., Advertising & Sales Promotion Dept., 61 Broadway, New York 6—Booklet lists the advantages of desulphurizing molten metal with soda ash, particularly with the company's dense soda ash. It is written in nontechnical language, for the practical foundryman.

For More Details Circle No. 128—Page 319

WELDING ROD: Wall-Colmonoy Corp., 19345 John R St., Detroit 3—Form 102 describes properties, application methods and typical uses of hard facing welding rod that is said to resist extreme impact and abrasion. Forty-eight typical parts hard faced with the alloy are listed.

For More Details Circle No. 129—Page 319

SAND BLAST HOSE: B. F. Goodrich Co., Akron, O.—Catalog 4440 describes a new lightweight, highly flexible sand blast hose. The catalog gives specifications, describes materials and methods used in manufacturing the hose and offers tips for doubling hose life.

For More Details Circle No. 130—Page 319

CASTINGS: McLanahan & Stone Corp., Hollidaysburg, Pa.—Bulletin contains photographs and information concerning castings produced in sizes up to 20,000 lb in chilled gray iron, alloyed iron and bronze.

For More Details Circle No. 131—Page 319

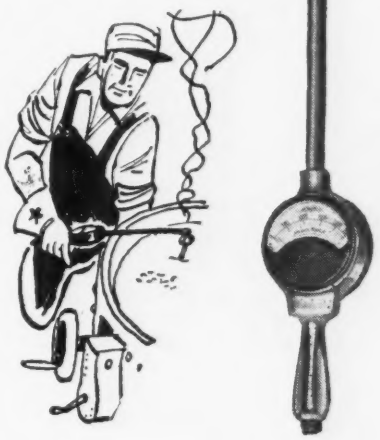
BRUSH SWEEPER: Moto-Mower Co., 4600 Woodward Ave., Detroit 1—Catalog describes sweeper with dual brushes that are arranged in tandem and rotate in opposite directions.

For More Details Circle No. 132—Page 319

EQUIPMENT BULLETIN: Denver Equipment Co., 1400 Seventeenth St., Denver 17—Illustrated bulletin explains about the firm's extensive testing laboratories and their services. It also pictures the major

Pyro Lance!

for accurate measurement of heat of MOLTEN METALS



For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface —unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 511, 420 N. LaSalle St., Chicago 10, Illinois.

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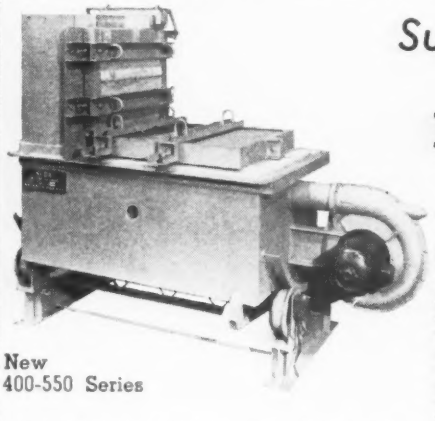

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550	Iron	550	2700	550	Iron	550 #	15.5
	Bronze	600	875		Bronze	600 #	5.0
1000	Iron	1000	3350	1000	Iron	1000 #	19.0
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items of equipment produced by the company for use in mining, ore dressing, ceramics, etc.
For More Details Circle No. 133—Page 319

FAR-INFRARED HEATERS: Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8—Folder lists and discusses what the manufacturer claims are the ten advantages of far-infrared electric radiant heaters for various industrial heating applications, including core drying.
For More Details Circle No. 134—Page 319

PORTABLE CONVEYORS: May-Fran Engineering Inc., 1710 Clarkstone Rd., Cleveland 12—Bulletin MF-2-413 contains information pertaining to portable and semiportable adjustable conveyors. Performance data, photographs of equipment in typical installations and other points are covered.
For More Details Circle No. 135—Page 319

DEVELOPING IDEAS: Battelle Development Corp., 505 King Ave., Columbus 1, O.—Booklet points out that "Ideas for technical development serve no one until they are put to work," and it outlines a mechanism for the development of creative ideas to the stage where they are of practical use.
For More Details Circle No. 136—Page 319

DEFENSE PRODUCTION: E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33—Revised booklet for plants concerned with defense production lists the company's products meeting various governme specifications under such classifications as rust preventives, lubricants cutting oils, metalworking aids an leather and synthetic rubber products.
For More Details Circle No. 137—Page 319

CENTRAL VACUUM CLEANING Billmyre Blower Division, Lamson Corp., Syracuse, N. Y.—Bulletin D-5 provides complete information on a central vacuum cleaning system fo industrial and commercial applica tions. Diagrams, photos, design fea tures, engineering data and other ma terial are included.
For More Details Circle No. 138—Page 319

MECHANIZED ACCOUNTING Remington Rand Inc., 315 Fourth Ave., New York 10—Folder recount the use of mechanized accounting t keep customer records up-to-date make detailed distributions with les effort than before and maintain com plete accounting control.
For More Details Circle No. 139—Page 319

FURNACES: The Carl-Maye Corp., 3030 Euclid Ave., Cleveland 1 —Bulletin HT-53 is devoted to th company's furnaces and ovens fo annealing, tempering, stress relievi ing, holding, aging, billet heating an other purposes. Illustrations sho many types of installations in variou plants.
For More Details Circle No. 140—Page 319

ADJUSTABLE RAMPS: Row Methods Inc., 2534 Detroit Ave Cleveland 13—Brochure contains ap plication photos, main componen photos, engineering drawings, spec

fications, operating and construction features data and other information pertaining to ramps to bridge the difference in height between shipping and receiving docks and vehicles.
For More Details Circle No. 141—Page 319

ROLLER CHAINS: Chain Belt Co., Baldwin-Duckworth Division, Springfield 2 & Worcester 3, Mass.—Catalog 52-1 discusses the use of roller chain and the way to select standard roller chain drives. Roller chain and stock sprockets made by the company are illustrated and described. Information also is provided relative to chain vises, flexible couplings and coupling covers.
For More Details Circle No. 142—Page 319

GAS METERS: Roots-Connersville Blower, Connersville, Ind.—Bulletin M-152 is on meters for measuring gases of any type in quantities from 4000 to 1 million cu ft. In addition to detailed text and illustrations of such meters, the booklet contains a selection table to determine the meter required for any load whether at standard or variable temperature and pressure conditions.
For More Details Circle No. 143—Page 319

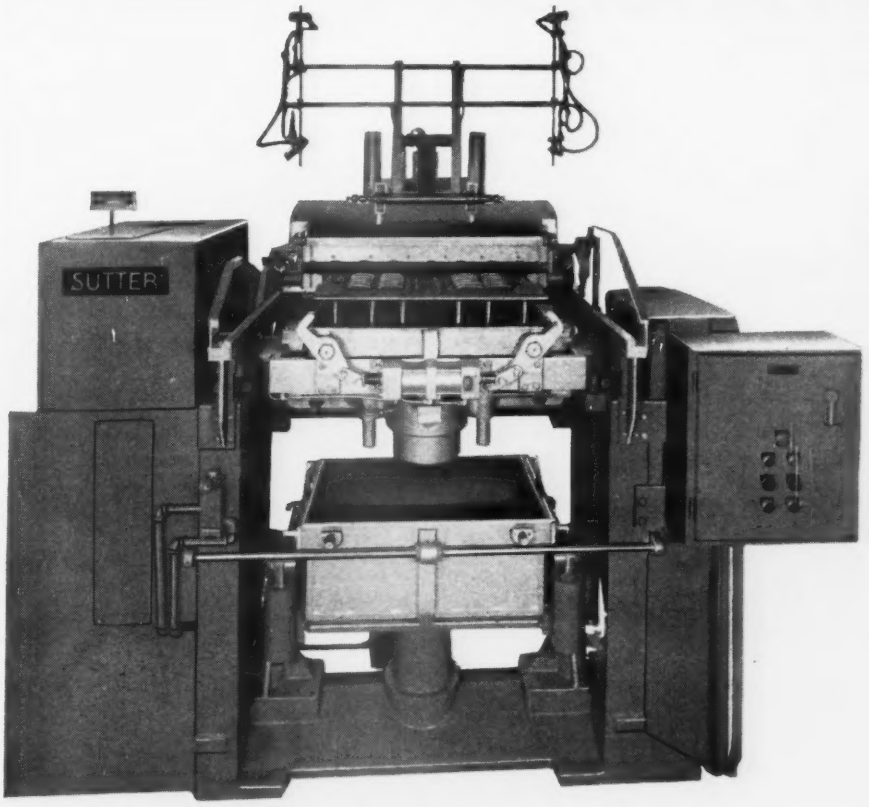
RECORDER CONTROLLER: Foxboro Co., Foxboro, Mass.—Bulletin 465 explains operations and applications of circular case controller for automatic control of temperature, pressure, liquid level, humidity or other process variables. Points covered include installation, nature and function of components, classes of measuring systems available and other data.
For More Details Circle No. 144—Page 319

BLAST MACHINE: Pangborn Corp., Hagerstown, Md.—Bulletin 223 illustrates construction features of the organization's blast machine and shows how it makes possible production savings. Detailed dimensions and specifications for 6 and 12 ft models show how the equipment can fit into a cleaning room operation.
For More Details Circle No. 145—Page 319

MERCURY VAPOR LAMPS: Westinghouse Lamp Division, MacArthur Ave., Bloomfield, N. J.—Booklet A-5112 offers revised information on fluorescent mercury and straight mercury type lamps. General in-

"Hey fellas, look what I scraped up!"

NOW SHELL MOLDING for SHORT RUN PRODUCTION



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Reduced labor costs, better molds, better surface finish and closer tolerances on castings, are but a few of the advantages inherent in the shell molding process. Now those advantages can be had by foundries not running long run production! Sutter Automatic Shell Molding Machines make this possible.

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formation, performance data, applications, auxiliary equipment and other matters are covered.
For More Details Circle No. 146—Page 319

ZINC DIE CASTINGS: New Jersey Zinc Co., 160 Front St., New York 38—Volume 21 Number 1 of *The Alloy Pot*, the company's publication, reports, with photographs, on applications of zinc die castings made from the firm's alloys. Also available is a reprint of "Zinc Availability Points up Its Advantages for Die Casting," from *Purchasing News*.
For More Details Circle No. 147—Page 319

PRESSURE TESTER: Modern Industrial Engineering Co., 14230 Birwood, Detroit 4—Bulletin describes pressure testing machine that detects and locates leaks in automotive engine exhaust manifold castings. It includes complete operating description and specifications.
For More Details Circle No. 148—Page 319

SAFETY POSTERS: Baker-Raulang Co., Industrial Truck Division, 1230 West 80th St., Cleveland 2—Eight safety posters designed to remind industrial truck operators of safe driving and operating practices are printed in color on 14 x 22-in. sheets. Complete set of eight is available.
For More Details Circle No. 149—Page 319

RESEARCH LABORATORIES: Walter Kidde Constructors Inc., 140 Cedar St., New York 6 or 1205 Holman Ave., Houston 4, Tex.—Brochure points out the advantages of employing an integrated company to design and construct research laboratories for industry. Examples of the organization's work are included and pictured.
For More Details Circle No. 150—Page 319

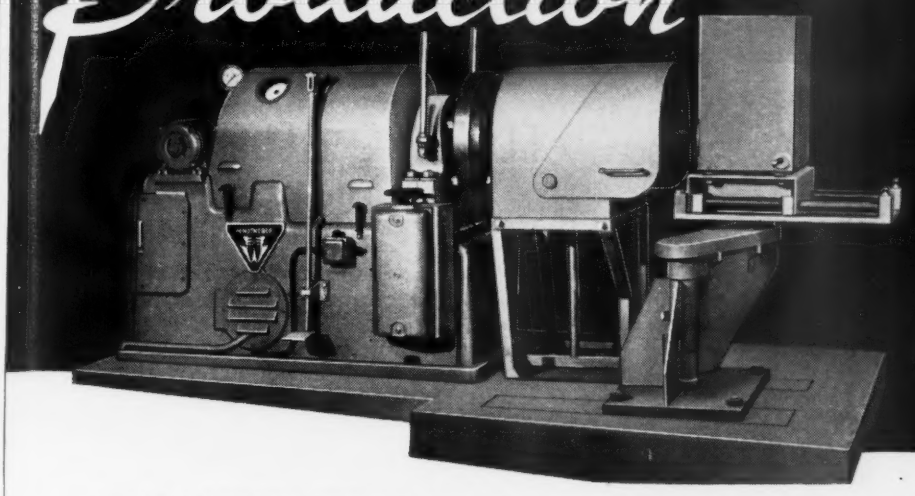
SOLVING SAW PROBLEMS: Skil Corp., 5033 Elston Ave., Chicago 30—Manual on cutting applications with portable power saw lists proper blade selection, proper cutting technique and helpful hints and suggestions for cutting 30 different materials.
For More Details Circle No. 151—Page 319

WELDING METAL: Sightmaster Corp., 111 Cedar St., New Rochelle N. Y.—Information sheet deals with welding or soldering metal for use with any aluminum or zinc-base alloy. The nature and the advantages of the product are explained.
For More Details Circle No. 152—Page 319

GRANITE SURFACE PLATES: Lawley Granite Surface Plate Co. 1412 Packard Bldg., Philadelphia 2—Catalog sheet lists standard sizes and prices of black granite surface plates reported to have overall accuracy up to 0.00005 in.
For More Details Circle No. 153—Page 319

INSTITUTIONAL EQUIPMENT: Precision Equipment Co., 3712 North Milwaukee Ave., Chicago 41—Catalog features steel shelving, lockers and other storage and maintenance equipment for industrial and institutional use.
For More Details Circle No. 154—Page 319

Production



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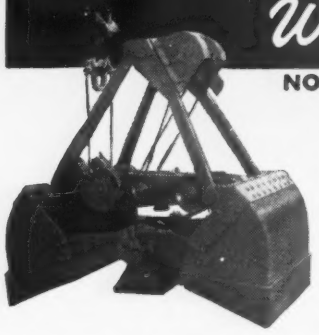

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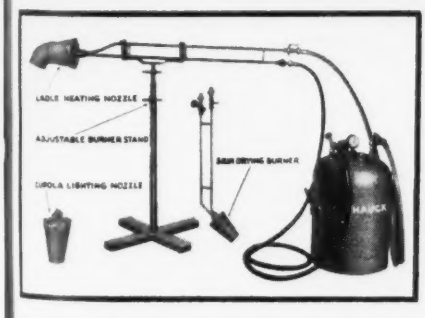

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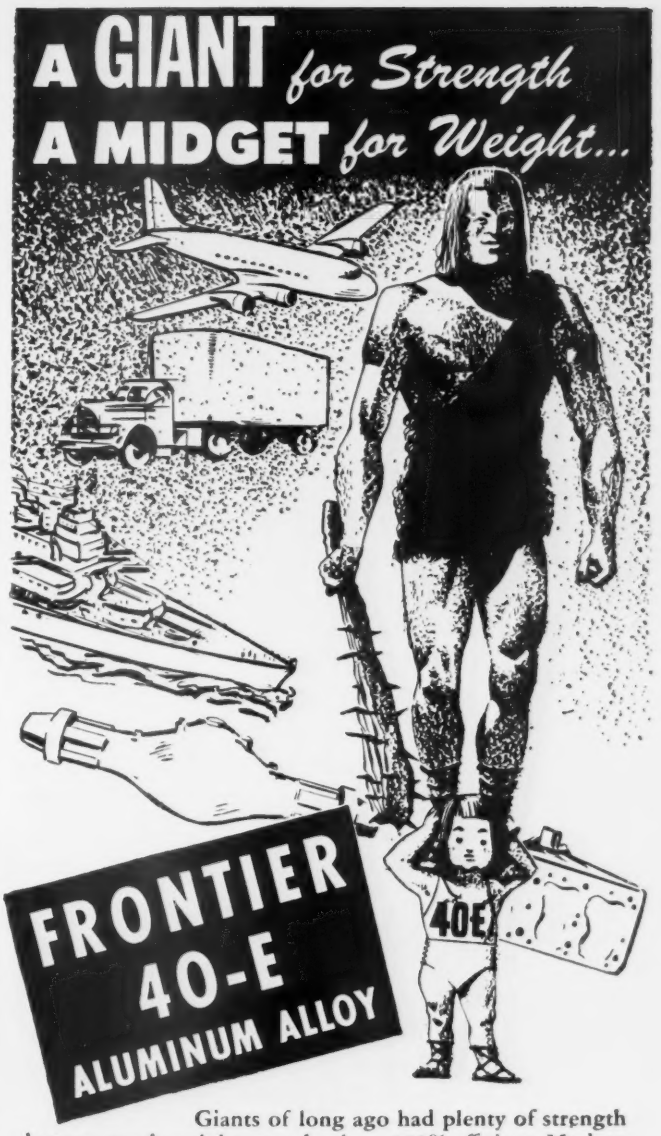

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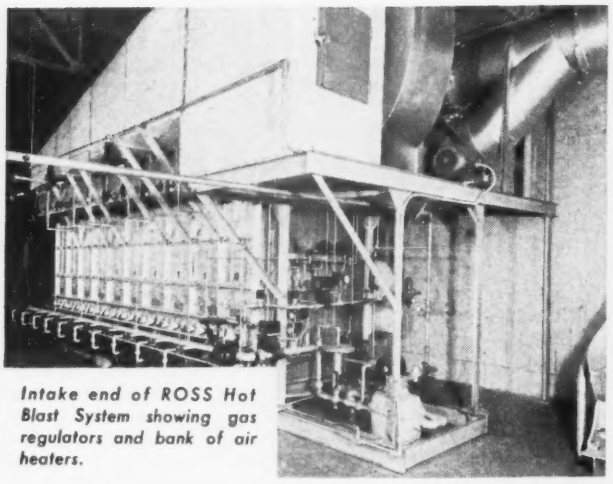

Intake end of ROSS Hot Blast System showing gas regulators and bank of air heaters.

ROSS *hot blast* CUPOLA HEATING

The secret of the savings being secured in the Richmond, California plant of American Radiator & Standard Sanitary Corp. lies in the hotter iron obtained from operating their ROSS Hot Blast System. This modern method of preheating the air to the cupolas produces substantial saving in coke and silicon, reduces loss due to rejects and cuts maintenance expense to the minimum. At present costs for fuel, labor and material, no modern foundry can ignore such savings. Write for particulars.

ROSS also supplies a complete line of Core Ovens covering range up to 1000° F. Box or Batch Type for greater flexibility. Horizontal or Vertical Continuous Type for efficient handling of volume production.

J. O. ROSS ENGINEERING CORPORATION

Designers and Builders of Air Processing Systems

ROSS SYSTEMS

NEW YORK 22—444 Madison Avenue
CHICAGO 6—201 N. Wells Street
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ROSS ENGINEERING OF CANADA, LTD.—MONTREAL, VANCOUVER
CARRIER ROSS ENGINEERING COMPANY, LTD., LONDON, ENGLAND

The biggest "FAN CLUB" in America is made up of leading Heating and Ventilating Engineers who specify HERMAN NELSON PROPELLER FANS!

Send your "FAN MAIL" to:

American Air Filter
COMPANY, INC.
215 Central Avenue
Louisville 8, Kentucky

Hammond OF KALAMAZOO
GOOD MACHINERY SINCE '82

MODERN *Self Contained* GRINDER-POLISHER

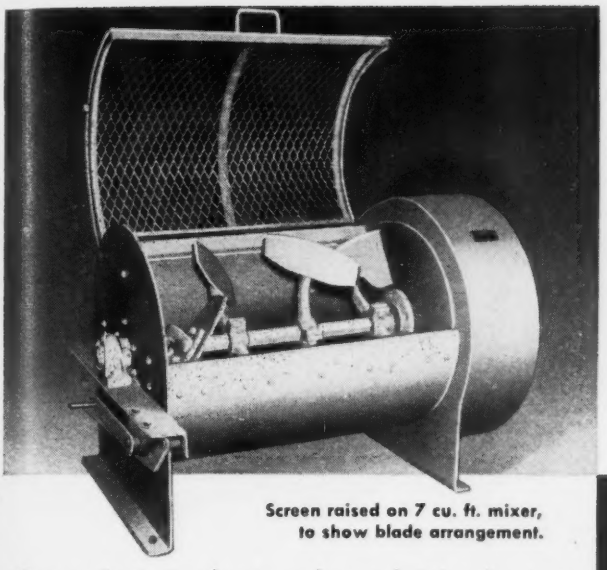
Hammond Variable Speed (1500 to 3000 RPM) Polishing and Buffing Lathe. Models up to 50 HP available.

Hammond Cyclone Duskolector. One of a wide line of Cyclone and Filter Types.

Hammond Backstands. 10 Air and Spring Tension Models to choose from.

Write for Catalog No. 60 showing America's most modern and complete line.

Hammond Machinery Builders INC.
1605 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

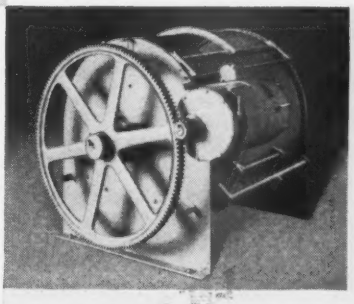


Screen raised on 7 cu. ft. mixer, to show blade arrangement.

For a fast 4-minute mix—
MULTI-MIXER

- With multi-blades for perfect mixing
- Direct drive motor, no clutch or belts
- Wear resistant liners and paddles

Get a fast 4-minute mix and ½-minute discharge for your core and molding sands, and cupola patch mixes. Get a perfect mix too, with the best blade arrangement in any mixer—it cuts, turns, and kneads ten times with each shaft revolution. These trouble-free Multi-Mixers come in capacities from 3 to 60 cubic feet. Larger and special mixers made to our specifications. See your foundry equipment dealer or write us direct.

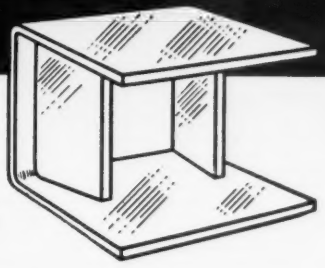


Rear view of 7 cu. ft. mixer, with gear guard removed, showing direct drive motor. Anti-friction bearings throughout. Quick acting discharge door is operated from the front of the mixer. Mixers are shipped complete, ready to install and operate.

MULTIPLEX MACHINERY COMPANY

DIVISION OF MULTIPACK, INC. • ELMORE, OHIO

Extra strong, patented design saves money, permits thinner gauges



Buffalo CHAPLETS

Easier burning in without chilling is the direct benefit of Buffalo Patented Angle Stem and Double Angle Chaplets. The fact that they have added strength, by reason of their exclusive design, permits them to be made in thinner gauges . . . *at savings to you!* In addition, thorough coating makes instant fusion with molten metal a certainty!

Make sure of meeting your chaplet needs exactly. The "Buffalo" line is one of the most extensive in the world.

Complete information in Catalog No. 16

Manufactured by

Combined SUPPLY & EQUIPMENT CO., INC.

211 CHANDLER ST., BUFFALO 7, N. Y.

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.

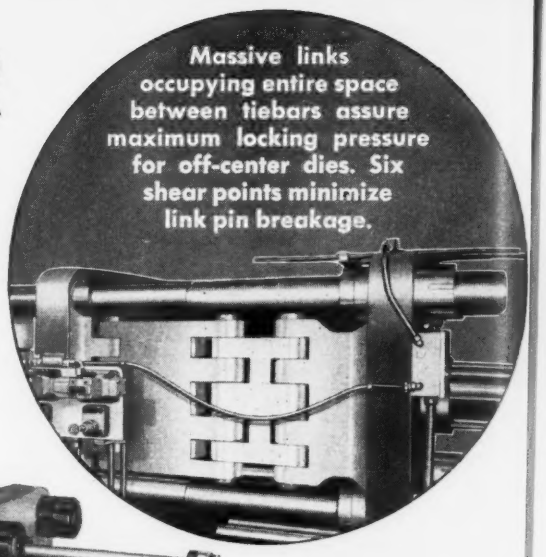
Manufacturers of Pneumatic Tools Since 1903

DAYTON, OHIO

CAST - MASTER

Die Casting Machines

STURDY, RIGID CONSTRUCTION ASSURES TOP EFFICIENCY, LOWER OPERATING COST!



Massive links occupying entire space between tiebars assure maximum locking pressure for off-center dies. Six shear points minimize link pin breakage.

COMPLETE SPECIFICATIONS ON REQUEST!

ALL CAST-MASTER MODELS CAN BE CONVERTED FROM COLD CHAMBER TO GOOSENECK MACHINES AND VICE-VERSA —SERVING A DUAL PURPOSE!

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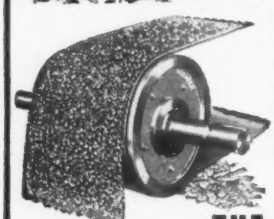
FOR SAND SLINGERS, CONDITIONERS AND CONVEYORS . .

HERE IS THE ANSWER TO YOUR MAGNETIC SEPARATOR JOBS!

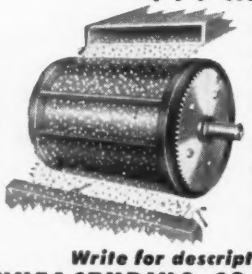
HOMER "*Power-Plus*" Magnetic Separators

Permanent non-electric—Unaffected by Heat, Cold, Moisture

. . . CAN BE USED INSIDE or OUTSIDE PLANT . . .

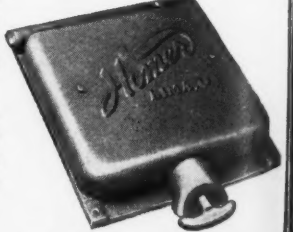


Homer MAGNETIC PULLEYS and UNITS —Available in standard diameters from 12″ to 30″; belt widths 4″ to 60″. Special sizes upon order.



Homer MAGNETIC DRUMS—Available in standard diameters from 12″ to 30″; face widths 4″ to 60″. Can be furnished with or without enclosure.

Homer MAGNETIC PLATES — Available in standard widths from 4″ to 26″; lengths and number of poles as required. Special fabrications to your specifications.



Write for descriptive bulletins

THE HOMER MANUFACTURING CO., INC., DEPT. 156, LIMA, OHIO

Combat **HEAT FATIGUE** with

- **Salt lost through perspiration causes fatigue and heat exhaustion. Vigor and vitality can be increased—fatigue and heat prostration can be eliminated by taking PEP-UP Impregnated Salt Tablets.**
- **Meets Government Specification No. SS-S-31D.**

Write for literature and prices

PEP-UP Impregnated Salt Tablets come to you in sanitary, factory sealed dispensers at no extra cost.

UNITED STATES SAFETY SERVICE CO.
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TERRE HAUTE
SPECIAL
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DRYING TIME IS CUT
DISCARDS REDUCED
SMOOTHER CORES

LARGEST SELLER IN THE FIELD!

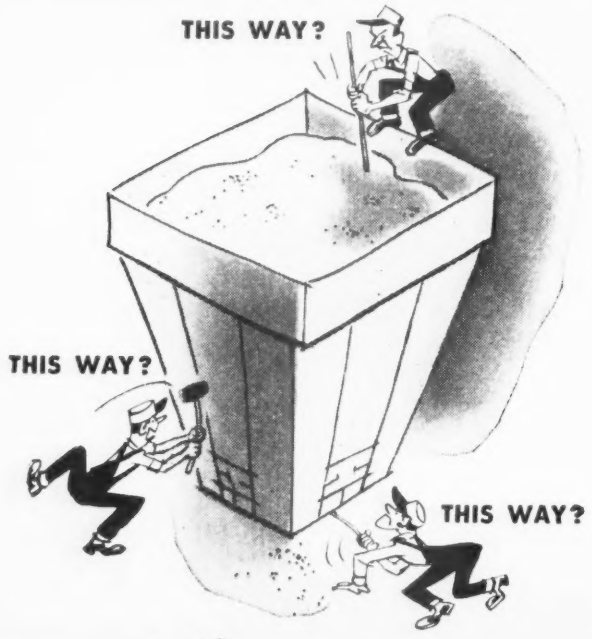
KORDEK®, the preferred dry bond for cores...

Full technical service, without obligation, is available to show how you can profit from the use of MOGUL® Cereal Binder in your production.

Write Technical Sales Department

CORN PRODUCTS REFINING COMPANY
17 BATTERY PLACE, NEW YORK 4, N. Y.

How do YOU keep stuff flowing from bins?



Do it the new way with PNEUBIN

Delays . . . dangers . . . damage and din . . . PneuBin does away with them all! Pulsating neoprene panels, mounted inside the walls, keep stubborn materials flowing from any type of bin or hopper. They work noiselessly, by positive displacement . . . move the contents, not the bin.

See PneuBin in Booth 917. . . Materials Handling Exposition, Philadelphia, May 18-22

PneuBin can solve your toughest bin-flow problem . . . without the hazard of prodding from above or below, the damage inflicted by hammer blows or vibration, the fatigue caused by shattering noise. PneuBin's efficiency, dependability and economy, proved in many leading plants, will be a boon to yours.

Write for "Flow Stoppage Report" form . . . no obligation.

GEROTOR MAY CORP., Baltimore 3, Md.

PneuBin

by the manufacturers of

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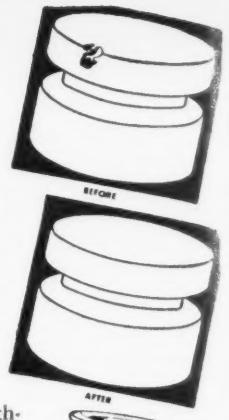
HYDRAULIC PUMPS & MOTORS

For Surface Blemishes in ALUMINUM CASTINGS



Have you used the Smooth-On Foundry Cement made especially to correct blow holes, porous and rough spots, dents and other unsightly but harmless surface defects in otherwise sound *aluminum alloy castings?*

Applied like the widely used Smooth-On *Iron* Foundry Cement, Smooth-On No. 8 *Aluminum* Cement fills in evenly, hardens quickly, matches perfectly. Stays in place, too, for it expands slightly as it sets.

Smooth-On No. 8 Aluminum Cement comes in 1- and 5-lb. sizes. 1 lb. will fill 17 cu. in. Order it by NAME AND NUMBER from your supply house. If they haven't it, write us. If you have not yet discovered Smooth-On No. 8, ask us for

FREE SAMPLE TO TEST

You'll receive also the famous 40-page SMOOTH-ON HANDBOOK, filled with industrial uses for the various Smooth-On Cements. 140 illustrations. Write today.

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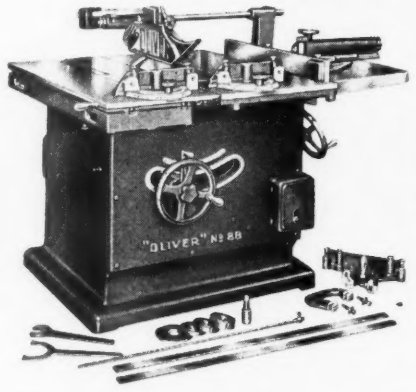
Do it with **SMOOTH-ON**
No. 8 ALUMINUM CEMENT

"OLIVER" No. 88-D

Tilting Arbor Miter Saw



A large capacity, accurate machine for pattern shops

4 other models offered with extension tables for handling large stock

Saw arbor tilts to any angle up to 45° permitting the operator to rip, cross cut, miter or dado while work remains flat on table. An 18" saw projects 4¾" through table which has 4¼" vertical movement. Rips up to 50"; cross cuts 48" by 1" thick. Fitted with most accurate set of graduated gauges. *Write for Bulletin No. 88-D.*

OLIVER MACHINERY COMPANY

Established 1890 GRAND RAPIDS 2, MICH.

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For low cost cleaning

- AMASTEEL is the blast cleaning material that is engineered for the job.
- AMASTEEL assures the lowest cleaning cost.
- AMASTEEL lasts many times longer. Investigate!
- AMASTEEL provides peak efficiency in shot for blast cleaning and peening. Developed by the maker of "PEENBLAST", "CLEANBLAST" and "ALLOY 99".

Abrasive for any and all kinds of work.

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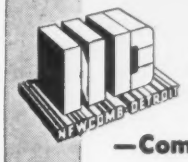
NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF



"Uni-Wash"
DUST COLLECTORS
Recirculating Water Type —Compact—Efficient—Proven by Foundry Users

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"Scroll-Aire" **CORE OVENS**
More Air Circulation— Faster Bake and Better Cores

ESTABLISHED 1912
- **DETROIT DIVISION**
- **GRAND RAPIDS DIVISION**
- **NEWCOMB INDUSTRIES, LTD., WINDSOR DIVISION**

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No more rejects due to poor dry—

BURDETT

"Radiant Heat"

CORE DRYING SYSTEMS

From the records of the Chicago Aluminum Casting Company—the fastest and most economical method of core drying is Burdett gas-fired, Radiant Heat. Here is what the records show:

1. Rejects are now eliminated, because every core is thoroughly dry in specified time regardless of load density.
2. Definitely no hot-spots—excellent penetration of both load and individual core.
3. More rapid temperature pick-up on recharge.
4. Cleaner heat than old conventional type oil system.
5. Average load 2½ hours at 400° F.

There is no obligation for Burdett recommendations. Ask for complete information.

BURDETT MANUFACTURING COMPANY

3469 West Madison Street · Chicago 24, Illinois

Also Manufacturers of "Radiant Heat" Systems, Ovens, Heaters, Air Make-Up Units, Spray Booths and Washers.

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YOU'LL LIKE OUR FAST SERVICE

LETTERS – TRADEMARKS – Wood & Leather Fillet

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TUMBLING BARRELS

Roller Bearing throughout
Direct Motor Drive with Speed Reducer
V Belt Motor Drive—Tight & Loose Pulley Drive

ROYERSFORD FOUNDRY & MACHINE CO.

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ROYERSFORD, PA.

PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

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STEEL ? GRAY IRON ? MALLEABLE ? NON-FERROUS ?

The "KNOW-HOW" Is Up To YOU . . . . .

Put The SUPPLY PROBLEM Up To Us . . . . .

Serving Foundries of ALL Types Since 1918

Washed, Dried and Screened Silica Sands and Flours, Molding Sands, Core Sands, Blast Sands Bond Clays · Bentonites · All Types Fire Brick, Fire Clay, High-Temperature Cements, Castables, Ganisters, etc.

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WESTERN MATERIALS COMPANY

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SAND PACKS BETTER

AROUND STEM

UNDER HEAD

OPEN HEAD
Shoulder Radiator
CHAPLET
holds cores rigidly

REDUCES CASTING REJECTS

PATENTED

Write for Bulletin.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd.
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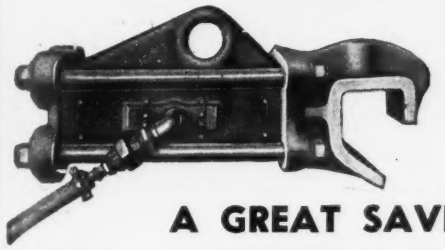
We also make Motor Chaplets, Boiler, Forged head, Fitted Head and other types of chaplets.

CLEVELAND *Chaplets*
Since 1890

"BRANFORD"
SHAKEOUT



A GREAT SAVER OF
TIME • LABOR • FLASKS

- Rugged, all steel construction to take the "gaff".
- Easy to install and economical to operate.
- Made in seven sizes, 2" to 8" piston diameter inclusive, capable of handling small pressed steel flasks up to large cast flasks.
- Jaw construction takes wide variation of flask flanges.

Send for questionnaire, fill in specifications and we will quote.

New Haven VIBRATOR COMPANY
130 CHESTNUT STREET, NEW HAVEN, CONN.

Designed for Speed • Precision • Compactness

The AIR CYLINDER
with the *Built-in Valve*

Air engineers agree: the closer the valve to the cylinder, the more efficient is air cylinder operation. In the Bellows Air Motor the valve, and all operating controls, are an integral part of the cylinder itself.

This built-in construction means quicker action, more positive response, surer control, and more economical operation. Built-in construction means compactness, simplified installation, minimum maintenance.

The Bellows Air Motor is made in five bore sizes: 1¼", 1¾", 2½", 3⅜" and 4½", and in any stroke length. You have your choice of a wide range of built-in valve assemblies: low or high voltage electrically controlled operation; standard or explosion proof; momentary air exhaust or maintained air pressure pilot valve operation; or mechanical operation for manual or direct-linked control. Whatever your pneumatic valving requirements there is a Bellows Air Motor with **built-in** valve to meet your needs. Wide range of mounting styles.

New Bulletin Write for this free new 36-page booklet. Dimensional specifications, technical data, wiring diagrams, case history studies, production and cost data. Address: Dept. FO 553, The Bellows Co., Akron 9, Ohio. Ask for Bulletin CL-50.

The Bellows Co.
AKRON 9, OHIO

"Controlled Air Power"

700A

FOR FASTER, SAFER, BETTER PRODUCTION

. . . Just pull the trigger WITH THE MURPHY PISTOL SPRAYER

and the HAMILTON SPRAY GUN

$10.00 F.O.B. Hamilton, Ohio

Complete with a 4½ ft. length of suction hose and sinker. For spraying molds and cores with liquids, for cleaning motors and machinery, for laying dust, for spraying hot roofing materials, and many other uses. Trigger control, guaranteed.

Just pulling the trigger of the MURPHY PISTOL-SPRAYER shoots a stream of blackening into inner pockets that could never be reached by the old-fashioned brush or swab method. This sprayer was designed by a practical foundryman and now it is widely used for cleaning permanent molds, for aluminum and other metals, and also for sand-blasting.

PRICES COMPLETE WITH SUCTION HOSE AND SINKER

PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Also a complete line of products designed to banish moisture from all kinds of air compression systems — Aftercooler, Separators, Filters, Traps, and Regulators.

Write for descriptive literature.

Over a million sold to date

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

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HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

SHORT CUT TO PROFITS

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WELDED AND BOLTED TYPES • ALL SIZES • COMPLETE CONTROL EQUIPMENT • 26 YEARS A LEADER IN MAGNETIC MATERIALS HANDLING.

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AN EXCELLENT BRASS FLUX
—Economical—
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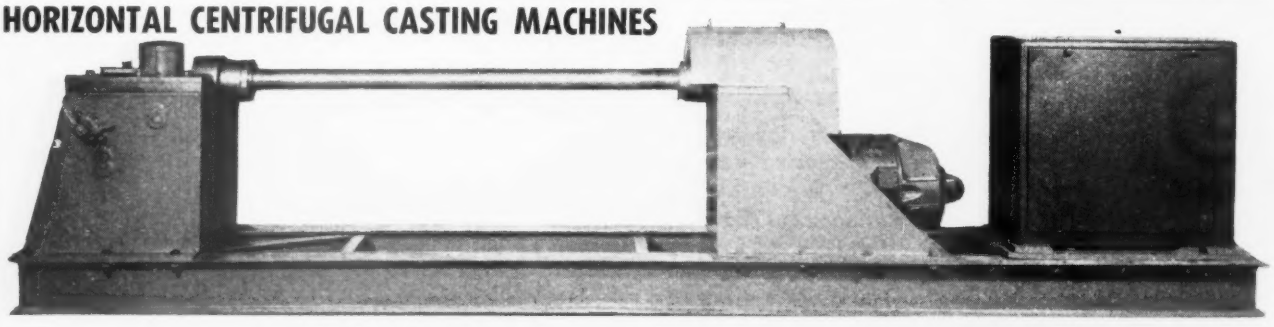
HORIZONTAL CENTRIFUGAL CASTING MACHINES



Ferrous or Nonferrous Castings — Permanent or Sand Molds
If You Are Interested In Making Pipe You Should Contact
AIMES CO., 1740 E. 12TH ST. CLEVELAND, OHIO

CLEANING COSTS GO DOWN...
PRODUCTION GOES UP...

when you use
AMERICAN SHOT AND GRIT

American's own manufacturing process assures you the uniform hardness and size that mean better, faster cleaning with fewer rejects. All sizes, graded to SAE specifications. In 100-pound bags.

The AMERICAN STEEL ABRASIVES CO. GALION, OHIO

MEMBER FEMA

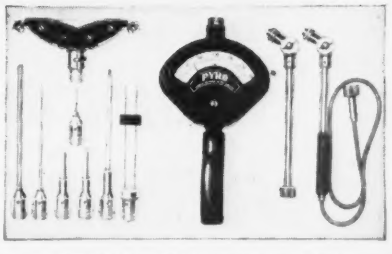
Measure Foundry Temperatures Accurately . . . at a glance!

Use the Simplified PYRO Optical Pyrometer

Any operator can quickly determine temperatures of minute spots, fast-moving objects and smallest streams with the simplified PYRO Optical Pyrometer. Completely self-contained—no calibration charts or accessories needed. An accurate, DIRECT-READING instrument that will pay for itself many times over by helping prevent spoilage. Weighs just 3 lbs. Available in 5 ranges (1400° to 7500° F.) *Write for FREE CATALOG #85, today!*

The Improved PYRO SURFACE PYROMETER

Handles all surface and sub-surface temperature measuring jobs. Has selection of 8 types of thermocouples; all interchangeable in seconds with no recalibration or adjustment. Automatic cold and compensator. Shock, moisture and dust proof. Accurate, 5" indicator. Available in 5 temperature ranges from 0-300° to 0-2200° F. Ask for FREE Catalogue #168.



THE PYROMETER INSTRUMENT COMPANY

New Plant and Laboratory

Bergenfield 6, New Jersey

Manufacturers of Pyro Optical, Radiation Immersion and Surface Pyrometers for over 25 years.

Use the Wall Firing Method for Better Heating and Drying of Ladles

HAUCK
Stationary
Oil and Gas
BURNER
Equipment

Gives

MAXIMUM SPEED AND ECONOMY

To heat ladles to the high temperature required in steel foundries, the Wall Firing Method, using stationary type Hauck High or Low Pressure Oil or Gas Burners, offers many advantages:

1. The wall confines the heat to the inside of the ladle.
2. Produces higher and more uniform ladle temperatures.
3. Reduces heat loss. — 4. Saves time and labor.
5. Burners are controlled from behind the wall.

Hauck engineers will gladly recommend the required size and arrangement of equipment for any application. Write for Catalog 1043.

HAUCK MANUFACTURING CO.

Oil and Gas Burners for Core Ovens, Annealing Furnaces, Heating and Drying

106 TENTH STREET • BROOKLYN 15, N. Y.

TYPE D
BRASS SLOTTED VENT — Head thickness .12", slot widths .010", .013", and .015". Use in curved core box surfaces.

TYPE C
STEEL SLOTTED VENT — Thin head, chrome plated, use in flat surfaces of core boxes. Slot widths .010", .013" and .015".

DEMMLER

PRECISION CORE BOX VENTS

TYPE H
SCREEN VENT — Brass body with stainless steel wire mesh. Standard meshes No. 30, No. 40 and No. 50 available.

TYPE L
LECTROMESH VENT — Brass vent, head made of .010" thick Lectromesh sheet, with .022" square holes.

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PERFORATED VENTS — Head of brass perforated sheet, .016" thick. Hole sizes: No. 00 (.020" dia.), No. 0 (.024" dia.) No. 1 (.027" dia.), No. 2 (.033" dia.)

TYPE B
PERFORATED VENTS — Staggered slots, .020" x .115"; brass vent with head of brass perforated sheet.

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WM. DEMMLER & BROS.

KEWANEE

ILLINOIS

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A strikingly, realistic figure of cast iron, hand painted in lifelike colors, stands on the edge of the black, cast iron tray, which is equipped with rubber feet to prevent scratching furniture. It's just the thing for your desk, waiting room or for a gift to a friend.

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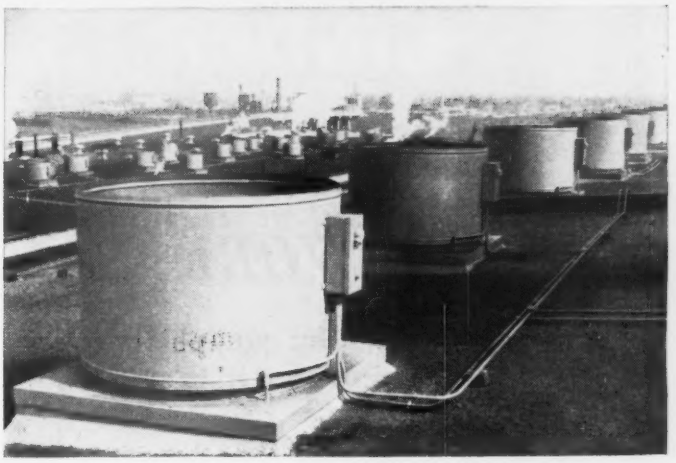

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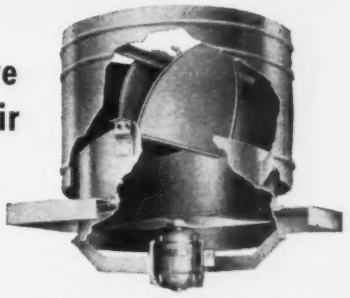

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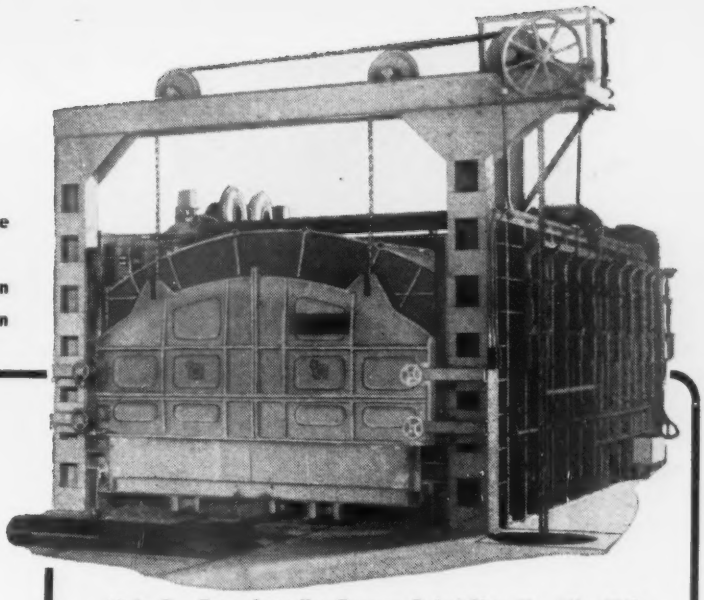

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Must have knowledge of all cleaning, and finishing equipment, also heat treating.

Excellent opportunity for right man. Salary and bonus.

In reply give all information. All replies confidential.

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With experience in Metallurgy. Give full details of training and experience. State compensation desired. Address: Box 609, FOUNDRY, Cleveland 13, Ohio.

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As an assistant to plant engineer of a progressive Eastern steel foundry. Must be mechanical graduate and capable of carrying duties in plant engineering, maintenance and construction work. Write giving full details on personal background, experience and salary expected.

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An old established foundry facing manufacturing company, is in need of a chemist. Location: Middle States.

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Help Wanted

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For a malleable iron jobbing foundry located in the East. Excellent opportunity for a man now employed below his top capabilities. Give complete record of education, experience, age, draft status, salary expected, and how soon available. All replies confidential.

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Experience in steel foundry practice desirable but not essential. In replying give complete information which will be held in strict confidence by a single executive. Address: Box 616, FOUNDRY, Cleveland 13, Ohio.

WANTED

Man to take charge of sales program for malleable iron foundry. Must have actual sales and administrative experience in this or kindred fields. Address: Box 614, FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER

List past experience and also state salary expected in first letter. Must be familiar with foundry work. Address: Box 583, FOUNDRY Cleveland 13, Ohio.

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Gray iron foundry located in Northeastern Ohio has an unusual opportunity for a practical foundryman able to handle a modern production core room of 80 including 3 assistant foremen.

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Salesman, with industrial clientele, wanted on high commission. Write complete personal and sales data in confidence. Include photo. BRAM CHEMICAL CO., 820—65TH AVE., PHILADELPHIA 26, PENNSYLVANIA.

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Twenty-two years as foreman and department manager in wood patternmaking in the medium to heavy iron and steel industry (foundry background and foundry connections) including also ten years purchasing patterns and castings, expediting and coordinating. Experience on patterns for the machine tool industry, power presses, rolling mill equipment etc. Best of references from wherever pattern equipment was used. Address: Box 626, FOUNDRY, Cleveland 13, Ohio.

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Twenty-eight years of gray iron experience and some nonferrous. Outstanding practical and technical background. Have supervised as many as three hundred men, 125 tons daily, production and jobbing, mechanized or semi. Excellent cost man, ability to handle men and can obtain results. Age 47. Address: Box 600 FOUNDRY, Cleveland 13, Ohio.

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Positions Wanted

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Presently employed with excellent record, desire change. Age 53; mature. Education in industrial engineering, metallurgy. Experienced in all phases good foundry practice, melting, sand control; mechanical, slinger or floor; pipe fittings, valves, automotive cylinder blocks, heads, small parts, general jobbing green or dry sand. Well trained in general foundry management, including sales and buying. Outstanding in labor, management relations and training employees and supervisors. Address: Box 606, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE

Experienced in all phases of foundry operations. Steel, iron nonferrous, plant and industrial engineering, cost control, accounting, industrial relations, machining administration. Address: Box 601, FOUNDRY, Cleveland 13, Ohio.

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Desires position as superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron, ductile iron and nonferrous, jobbing and high production shops, soil pipe and farm implements. Address: Box 607, FOUNDRY, Cleveland 13, Ohio.

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Desire responsible position in foundry production or engineering. Experience in mechanized gray iron foundry as assistant plant engineer, two years; plant engineer, three years. Presently employed. Age: 30, married. Mechanical engineering graduate. Address: Box 597, FOUNDRY, Cleveland 13, Ohio.

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Herman Jolt Rollover #6000, 40" x 60", 1947
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Stoney Double Jolt Knockout
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900 ft. 10" Logan Roller Conveyor 3½" dia
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1—12' x 7' x 3'6"
5—4'6" x 4'6" x 1'

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Roots Connersville Blower, 22 x 66, 75 hp
Geared Ladles
Spencer Turbo Blowers, 2250 cfm @ 16 oz
2850 @ 16 oz.

MISC. FOUNDRY EQPT.

Brinnel-Rockwell-Richie Testers
2—Int'l SB11 Core Blowers
Demmler #1 Core Blower
Baker Lift Truck, 6000# cap., 1948
Logan Wood Slat Conveyor, motorized. 36" x 35' Roller Conveyor
7—18" Pedestal Grinders.
Tons of Flasks 12 x 18 to 48 x 120
Core Blower, Champion, model CB400, 300 lb.
Roto-Clone units, 24W & 36W, with sludge ejectors
Vibrators, Osborn, 1⅝" x 2"
Welded Steel Pouring Crucibles, new, 1700#
Bottom Dump, Sand Buggies
Exhaust Fans—to 60"
Fire Extinguishers—CO2
Exhaust Blowers—all sizes

WE WILL BUY—FROM 1 PIECE UP TO ENTIRE FOUNDRY.

ALLIED MATERIALS HANDLING CO
4657 SPRING GROVE AVE.
CINCINNATI 32, O.
PHONE: MU 5465

For Sale

FOR SALE

BY

MOORE PLOW AND IMPLEMENT COMPANY

GREENVILLE, MICHIGAN

1—Wheelabrator Tumblast, size 36 x 42, Serial A63288

10—Haynes Jolt Squeezers

3—Milwaukee Jolt Squeezers

1—74/50 A.M. Sand Cutter, Serial 150

1—Rotoclone for wheelabrator, wet, serial N51071 #2½, Type N, ¼ H.P. ejector motor & 10 H.P. for fan, 2300 CFM, 220V, 60 cycle

1—Rotoclone for tumblers, wet, serial N651097, #2, Type N, ¼ H.P. for fan, 2562 CFM, 220V, 60 cycle

1—Rotoclone #12, Type D, dry, Serial D61235, 7½ H.P., 220V, 60 cycle, for grinders

1—Large Brinell Machine

1—E3245 Despatch core oven, serial 29605, gas fired, drawer type

1—Porbeck C-3C drawer type, gas fired core oven
Large quantity of jobbing flasks, all sizes
Large quantity of Hines, Fremont & Stripper flasks, all sizes, nearly new

3—36 x 60 Whiting RB exhaust tumblers, w/R.B. clutch

6—Drill Presses

2—Redford #2 Core Blowers, Serial #2-110-230

1—International Rollover Machine
Complete Grinding Room Equipment

1—P&H 2 ton electric hoist, new
Quantity of air tools

55—Shop trucks
Complete office equipment
Large quantity of other items, too numerous to mention

We are offering our foundry with 20 tons per day capacity and real estate, property completely fenced in and on Grand Trunk siding.

WRITE-CALL OR WIRE

MOORE PLOW & IMPLEMENT COMPANY

GREENVILLE, MICHIGAN

PHONE 225

FOR SALE

1—International Type PK Jolt Squeeze Pin Lift, 18" Cylinder, 8" Lift.

RAY P. SCULLY

SCULLY MACHINERY & EQUIPMENT CO.

767 MILWAUKEE AVE. CHICAGO 22, ILL.

PHONE: CANAL 6-0314

FOR SALE

Motors, Generators, Transformers from 1 HP to 2500 HP
World headquarters for T.E.F.C. and explosion proof motors.
World's largest inventory.

ELECTRIC EQUIPMENT CO.

ROCHESTER, N. Y.

FOR SALE

SAND DRYER AND COOLER, Bartlett & Snow rotary, 54" cylinder, 12' length, complete.
2 APRON CONVEYORS, under storage hopper type, 36" wide, 13' centers. Complete with 7½ H.P. motors, Link Belt reducer.

Equipment practically new
Engineering change eliminates use.

ILLINOIS FOUNDRY COMPANY

SPRINGFIELD, ILLINOIS

FOR SALE

10" x 30" Roots Connersville blower. Price: $800.00. Address: Box 592, FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

STERLING FOUNDRY FLASKS

51—Size 38 x 42½ x 6
49—Size 38 x 42½ x 16½
22—Size 38 x 38 x 8
29—Size 45 x 45 x 9
29—Size 45 x 45 x 10½
31—Size 36 x 36 x 6
26—Size 36 x 36 x 14½
46—Size 21 x 28½ x 10½
62—Size 21 x 28½ x 8

APPROXIMATELY 64,000 lbs.

GERITY-MAGNESIUM CORPORATION

ADRIAN, MICHIGAN

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
6750	24 oz.	Spencer	800	8 oz.	No. Am.
4500	16 oz.	G.E.	660	20 oz.	A-B
4000	42 oz.	Spencer	500	10 oz.	No. Am.
3500	40 oz.	Spencer	400	4.3 oz.	Spencer
2800	1 oz.	Spencer	340	20 oz.	A-B
2700	16 oz.	No. Am.	320	12 oz.	Spencer
2700	16 oz.	Spencer	225	16 oz.	Spencer
2500	7 oz.	Sturt.	180	15 oz.	Spencer
2200	16 oz.	No. Am.	9100	7" SP	Sturt.
2000	2½ oz.	Spencer	1100	4½" SP	Bayley
2000	1 oz.	Spencer	100	7" SP	Spencer
1150	20 oz.	No. Am.			

THE MOTOR REPAIR & MFG. CO.

1552 HAMILTON AVE.

CLEVELAND 14, OHIO

FOR SALE

1—6 ton Modern Geared Ladle w/square bail
1—20 x 3 x 8 For Swing Grinder, 15 H.P., w/rail and booth
7—International Type G Air-operated Jolt Rollover Machines—sizes: 20 x 6, 24 x 8, 24 x 10, 30 x 12.

ZENITH FOUNDRY COMPANY

1501 SOUTH 83RD STREET

WEST ALLIS, WISCONSIN

FOR SALE

1—Model "50" Beardsley & Piper Speedmuller complete with skip hoist, water meter, and electrical equipment, including motors and switches, 220/440 Volt, 3 phase, 60 cycle.
1—Portable Beardsley & Piper Sand Conditioner with magnetic pulley, lump breaker, motors and switches, 220/440 Volt, 3 phase, 60 cycle.
1—Model "M" Beardsley & Piper Screenerator, 3 HP motor, 600 RPM, 440 Volt, 60 cycle, 3 phase.

THE ST. MARYS FOUNDRY COMPANY

ST. MARYS, OHIO

FOR SALE

American Sandcutter, Model AM, Size 69/45, Serial #205: 220/440 Volt; in excellent working condition. Machine available immediately, complete with 70 ft. of cable and two outlet receptacles. Address all inquiries to: **KEUTHAN FOUNDRY DIVISION, THE BLACK-CLAWSON COMPANY, MIDDLETOWN, OHIO. PHONE: 2-8861.**

FURNACE FOR SALE

1947 Model Oil Fired Stroman Sklenar Furnace, 400 pound capacity, for nonferrous melting. Oil type with air powered tilt. Address: Box 577, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Riehle 20,000 lb. testing machine. First class condition, with tensile and compression attachments. The ideal control tool for a progressive foundry test bar program. Address: Box 604, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

One 100 KW Westinghouse transformer, 22000 volt primary 115-230 volt, three wire secondary. Address: **FORT PITT STEEL CASTING DIVISION, MC KEESPORT, PA.**

FOR SALE

Model #50 B. & P. Speedmuller with skiphoist loader. Also B. & P. Stationary Sandslinger having two speed 19" head and approximately 12 foot operating arm length.

STANDARD CASTINGS OF CINCINNATI, INC.

1734 POWERS STREET CINCINNATI 23, OHIO

PHONE: KIrby 6121

FOUNDRY EQUIPMENT
PRICES REDUCED!

BLOWERS

Spencer Turbo Blower, 4500 CFM @ 32 oz., 60 HP, 220/440 V motor. New 1946. $1850.00.

BRIQUETTING PRESS

Milwaukee Model 200, 2—25 HP pumps, 17 strokes per min., 3" dia. briquettes, 2 tons per hour capacity. Excellent condition. $8,500

CORE BLOWERS

Demmler 3E Drop Away Draw. New 1946. $950.00

CRANES

5 Ton P & H Overhead Elec. Traveling Crane, 30' 6" span, 15' lift, 3 motors, 220 V A.C., New 1946. $6000.00
10 Ton Northern Bridge Crane, box frame, double girder fish belly, 3 motors, 230 V D.C. 54'7½" wide c to c of wheels. Can be cut down to fit narrower span. $6500.00

ELECTRIC FURNACE

Pittsburgh Moore Rapid Lectromelt, Size V. 200#-300#. Heats 100 KVA. $3000.00.

GRINDERS

Fox Swing Frame, 10 HP, 3/60/220 V motor. $550.00
Ransom 8B Double End., 2-2" x 20" wheels. $600.00

HOISTS

Ingersoll Rand 4000# Type D, pneumatic. Late serial number. $500.00
500# American LoHed, 220 V. $150.00
2000# American LoHed, 220 V. $350.
2000# Detroit Electric. $300.
1000# Cleveland 220-440 V.
1000# Detroit 220-440 V.

LADLE

3 Ton Whiting Geared Ladle. Like New $450.

MOLDING MACHINES

2 Champion Pin Pushoffs 32" x 36" x 8" draw. New 1946. Excellent condition. $450 ea.
2 Champion Pin Pushoffs, 44" x 44" x 12" draw. New 1948. Excellent condition. $450 ea.
2 Champion Pin Pushoffs, 46" x 46" x 12" draw. New 1946. Excellent condition. $850 ea.
2 Champion Jolt Squeeze Strip Molding Machines, stationary 12" jolt cylinder, 8" lift, 18" x 21" table. $175 ea.
1 Champion Hand Rollover, 24" hand clamp, 26" x 16" table. $250.
1 Johnston & Jennings 218 Rollover Pattern draw table, 30" x 24". $600.
1 International 13 PJS Staty. Jolt Squeeze Molding Machine, 13" jolt cylinder, table 26" x 18". $250.
1 Herman Rollover Pattern Draw, 20" x 30" with 6" bumper. $2000.00
1 Herman High Speed Jolt Rollover, 4000# capacity, 30" x 60" with 32" x 48" bumper, 13" cylinder. Pattern device. $3000.00
1 Osborn Portable Jolt Rollover Pattern Draw, Model 601-13, 30" x 24" flask size, 10" draw, 900# capacity. $500.
1 Osborne 23" x 24" table jolt squeeze molding machine.
1 Osborne 17" x 24" 814P Rollover. The above two machines comprise a unit with overhead sand hoppers, belt feed and dump type. $3500. for unit.

MULLERS

Simpson #3H Style B, Air Cooling System, rotary screen. All motors and controls. $7500.
Clearfield #610 with 20 HP motors and controls. $2250.

ROD STRAIGHTENER

Pneumatic Wire Straightening Machine, guillotine type, excellent condition. $300.

ROTOBLAST

Pangborn Rotoblast Table. This unit was made for handling aircraft cylinders. It has been used very little. Complete with dust collector and shot elevator. Excellent condition.

SHAKEOUT

3' x 5' Link Belt, 220 V motor. Good condition $800.

SLINGER MOTORS

2—15 HP B & P Slinger motors and shafts.

WELDERS

Marquette Arc Welders, 200 BB, 220 V, 145 sec amps. $100 ea.

WHEELABRATOR

36" x 42" American 370 Cabinet Type Tumblast. 15 HP main drive. Excellent condition. $4250.00

STOP AND SEE US WHEN YOU ARE AT THE FOUNDRY CONVENTION. WE BUY FOUNDRIES OR INDIVIDUAL MACHINES.

ACME EQUIPMENT CO., INC.

126 S. CLINTON STREET CHICAGO 6, ILL.

PHONE: ANDOVER 3-3430

FOUNDRY EQUIPMENT, MACHINE SHOP & REAL ESTATE

to be sold at

PUBLIC AUCTION

THURSDAY, MAY 14, 11 A. M. (E.S.T.)

ON THE PREMISES OF

PITTSBURGH MILL STEEL CO.

4500 EAST LOMBARD ST.,

BALTIMORE, MD.

—•—

$1,500,000 REPLACEMENT VALUE
MECHANIZED NEW AND LIKE NEW

consisting of

Sand Slingers • Jolt Machines • Molders • Squeezers • 4-New General Electric Heat Treating Furnaces • Sand Conditioners • Mixers • Mullers • Fisher Furnaces • 2000 Lb. Furnace • No. 7 Blower • Core Ovens • Aging Ovens • 8-Coleman Transrack Ovens • Wheelabrator • Sand Blast Units • Dust Collectors • Rotoclones • Water Wash Grinding Booths • Snag & Flex Grinders • Shake Out • Rollovers • Conveyors • Air Compressors • Tanks • Oil Storage Tanks • Electric Cranes • Invincible Cat Crane • 30 Electric Hoists • Monorail System • Roller & Belt Conveyors • Electric Equipment • Transformers • Converters • General Electric X-Ray Machine • Southwark Tester • Spectrograph • Lab Equipment • Tool Room Machinery • Drills • Planers • Lathes • Pattern Shop

REAL ESTATE

9 Main Buildings and 6 Auxiliary Structures on 10.38 Acres of Land. Excellent Rail & Ocean Shipping Facilities. One of Baltimore's Choicest Industrial Sites 2½ Miles from Docks and 4 Miles from Airport.

Illustrated Descriptive Circular Mailed on Request

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Samuel L. Winternitz & Co.

Auctioneers—Liquidators—Appraisers

FIRST NATIONAL BANK BLDG., CHICAGO 3, ILL.

FOR SALE

ALL EQUIPMENT OF GRAY IRON FOUNDRY INCLUDES

No. 3 Cupola
Adams Molding Machines
Adams & Hines Flasks
Demmler No. 55 Core Blower
Tumbling Mill
Outdoor Truck Scales
Air Compressor
Sand Testing Equipment
Other Miscellaneous Items

DES MOINES FURNACE & STOVE REPAIR CO.
DES MOINES IOWA

FOR SALE

DREVER SALT BATH FURNACE

Bath Size 12' x 4' x 7' depth Radiant Tube Gas Fired Complete with North American Blower and Leeds & Northrup Automatic Recording Temperature Control. Maximum Operating Temperature 1250° F.

Suitable for Salt Desanding or Stainless Cleaning.

CARDINAL STEEL SUPPLY
2695 E. 79TH
CLEVELAND 4, OHIO

CLASSIFIED ADVERTISING

For Sale

FOR SALE

MOLDING MACHINES

2—No. 275 Osborn jolt squeezers.
8—13 x 8 Tabor power squeeze flask lift machine split pattern type.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
2—International PKL 14"-5½" Jolt Squeeze Pin Lift.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES

1—15 HP North American 2100 CFM at 16 ozs.
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz Spencer Turbine Blowers.

METAL MELTING EQUIPMENT

1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS

1—Stoney crane type shakeout.
1—Dings type M magnetic separator.
1—NC-4 sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
25 Tons steel flasks in sizes from 26 x 26 to 60 x 60.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—36W Wet Type Roto-Clone 34000 CFM.
1—24W Wet Type Roto-Clone 13000 CFM.
Complete stock of rebuilt mill and dust exhaust blowers.
1—27 x 36 American wheelabrator, tumblast with rubber belt.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

SAND BLAST EQUIPMENT

Wheelabrators-Tumblast size 48 x 42. $3000.00 to $4000.00.
Wheelabrator size 48 x 48. Like new. $5250.00.
Wheelabrator Tumblast 36 x 42. $4500.00.
Sly-master Blast size 36 x 42. Good condition.
Pangborn ES-207 Blast Cleaning Cabinet used for Strip steel or bar stock. $1750.00.
Sand Blast Cabinets, pressure tanks, dust collectors and blowers. All sizes.
Contact us for your sandblasting needs or any surplus sandblasting parts and equipment you have for sale.
Will accept your small machines as trade in on any of the above equipment.

DIAMOND SAND BLAST, INC.
5654 WEST JEFFERSON
DETROIT 9, MICHIGAN

FOR SALE

1—#2 American Wheelabrator Tablast Machine complete with eight 24' tables and accessories. Serial #A29509. Machine now in operation, available with exhauster if desired.
1—#1A American Wheelabrator Tablast Machine complete with six 26" tables and accessories. Serial #A41849. Machine now in operation, available with exhauster if desired.
4—Green Sand Molders' Hoppers. Capacity of each 4 yd. Hopper has single under cut jaw air operated.

CLINTON MACHINE COMPANY
MAQUOKETA, IOWA

For Sale

FOR SALE

6—Osborn #2047 Jolt Rollovers; 600 lbs. capacity 1943 Machines, Excellent Condition.
1—SPO Jolt Strip Squeeze Machine, 1948 A-1
1—Osborn 814-P, Jolt Strip Squeeze, Excellent.
1—Osborn 405 Rollover, Good Condition.
4—Champion Pin-Lifts Size 42-6, A-1 Condition.
1—International Pin Lift, 42-6, A-1 Condition.
1—American Sand Cutter, size 69 x 45, Model AM, 1945, Good Condition.
2—Vaporfiers #5, Ser. #320 and 321. Mfg. Vaporfier Corp. Good Condition.
1—Osborn #275-J Jolt Squeeze Molding Machine, Ser. #77037, A-1 condition.
1—Johnson & Jennings Jolt Squeeze Molding Machine, Ser. #20873194.
2—Simplicity Shakeouts, 3' x 3', new in 1948.
1—Simplicity Shakeout, 3' x 5', new in 1948.
2—Spencer 5400 C.F.M. 16 oz. 40 H.P. Motor.
1—Rheile Tester 100,000 lbs. Screw Type.
1—Rheile Tester 150,000 lbs. Screw Type.
1—Holding Furnaces, 300 lbs. capacity, Alum.
1—Bradley Hammer, 10 H.P. Motor, 1945.
1—G.E. Battery Charger, M.G. Set, NEW.
2—Gardner-Denver air compressors, 2 stage, 6 cylinder, water cooled, 455 CFM, 140 lbs. PSI, 93.7 B.H.P. with inter-cooler, one unused, one used with spare parts for rebuilding.
1—Baird #10 Tumbling Barrel, 100 lbs. cap.
1—Universal Blower, Size B40
1—#2 Royer Sand Conditioner, Portable
1—Dietert Permeability Meter, Ser. #2722

LIFT TRUCKS

1—Clark Fork Lift Truck, 6000 lbs. 108" Lift.
1—Towmotor Fork Lift Truck, 5000 lbs. 9' Lift.
1—Automatic Platform Lift Truck, 5' Lift, 3000 lb. Electric, 1946 Machine, Excellent.
1—Lewis-Shepard Jack Lift Trucks, 4000 lbs. capacity, Hydraulic, New in 1950, A-1 Shape.
1—Towmotor Fork Lift Truck, 3,000 lbs. 7' lift. 1946 machine. Used very little. A-1.

HOISTS, AIR: ELECTRICAL: MECHANICAL.

1—Small Ingersoll Air Hoists 1,000 lb. cap.
1—P.H. Electric Hoists, 2,000 lb. cap. 220/440 60 cycle, 3 phase.
1—Ingersoll-Rand Air Hoist, 4000 lbs. cap. with power trolley.

LARGE ASSORTMENT OF HINES ALUMINUM POP OFF FLASKS AND JACKETS, STEEL FLASKS: TRANSITE CORE PLATES. EQUIPMENT LISTS AVAILABLE ON REQUEST.

A.A.A. MACHINERY & EQUIPMENT CO.
456 EDDY ROAD CLEVELAND 8, OHIO

For Sale

FOR SALE

17,000 FT.

#458 OVERHEAD CHAIN CONVEYOR

any part

Jervis B. Webb—Link Belt—Saginaw

Trolleys—Attachments—Curves,

Take Ups—Hooks—4" I Beam, etc.

Like New & Used—Excellent cond.—Latest Type.

Save Up to 65% of New Cost.

This Conveyor just removed from former Lustron Co., Columbus, O.

ALLIED MATERIALS HANDLING CO.

4657 SPRING GROVE

CINCINNATI 32, OHIO

TESTING MACHINES

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.

OUR 36th YEAR

CONSOLIDATED PRODUCTS CO., INC.
13-20 PARK ROW NEW YORK 38, N. Y.
TELEPHONE: BARCLAY 7-0600

FOR SALE

2—Mechanized Sand Systems.

MELTING EQUIPMENT

2—#8 Whiting Cupolas chargers and centrifugal blowers.
1—Fisher 100 Gas Fired Tilting Furnace.
1—Strohman Aluminum furnace—350# cap., stationary.
7—Monarch Furnaces with blowers — barrel type—#94.

BLOWERS

1—Allis Chalmers Turbo Blower—8500 CFM at 1.5# pressure.
2—48" Blowers—20 HP—Low Pressure.
1—North American 10 HP—1300 CFM at 16 oz.
1—North American 4 HP.
3—North American 5 HP—600 CFM at 16 oz.
1—General Electric 30 HP Blower—5700 CFM at ¾# pressure.
1—Rotoclone Type "D"—Size 10W.
3—40 HP Spencer Turbo Blowers, 3600 CFM, 24 oz.

AIR COMPRESSORS

1—Sullivan 40 HP Air Compressor.

SAND HANDLING

1—Tractor Sand Slinger, 16" head.
1—Mobile Sand Slinger—300 cu. ft. tank.
1—Rotary Oil Fired Sand Dryer—42" x 20' long.
Tumbling Barrels, Round and Square.
12—Hydraulic Lift Trucks, all sizes.

MOLDING MACHINES

14—Osborn 275J Portable Molding Machines.
2—28A Davenport Rollovers.
1—4' No. 1 Simpson Mixer.
1—Johnston & Jennings 683 Jolt Stripper.
125 Machines in stock. All types.
8—Core Ovens. All types.
10 & 15 Ton Bottom Pour Ladles.
16—1000 & 1500# Worm Geared Ladles.
100 Tons Steel Flasks, core plates, small flasks.
Send for lists. Largest stock of used foundry equipment in the United States.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD STREET

SHILLINGTON, PENNSYLVANIA
PHONES—READING—30311—40146
R. B. HARRISON, MGR., FDRY. DIV.

FOR SALE

Molding Machines

1—Mold Conveyor complete with 35 cars 38" x 72"
3—#2166 Spo Jolt Squeeze Pin Lift
4—#814-P Osborn Jolt Squeeze Pin Lift
1—6000# Herman Rollover, Jolt and Pattern Draw 42" x 90"
5—#601-13 Osborn Jolt Rollover and Pattern Draw
4—#2047-4 Osborn Jolt Rollover and Pattern Draw for cylinder head core production
1—30" x 40" Tabor Jolt Rollover and Pattern Draw, 1000#, 12" draw
1—22" x 42" Tabor Jolt Rollover and Pattern Draw, 600# 10" draw
3—SA-34 Davenport Jolt Rollover and Pattern Draw, 2500# jolt cap., 15" draw, 34" x 48" table, flask 36" x 64"
1—SA-28 Davenport Jolt Rollover and Pattern Draw, 1500# jolt cap., 12" draw, table 30" x 40"
5—Champion Draw Power Pushoff Machines 10" draw, 38" x 40" table
3—International Type JFL Jolt Ram, Foot-lever Pin Lift.
3—International Type R Hand Rollover

Core Room Equipment

1—#1 Demmler Core Blower
6—#92 Osborn Core Blower
1—20" Paddle type sand mixer
2—#3 Simpson Mullers
2—#2 Simpson Mullers
2—#70 Beardsley-Piper Mullers
1—Revolving Core Conveyor Table
1—Link-Belt Core Breaker Drum approx. 6' x 10'
Various sizes transite core plates

Cleaning and Grinding

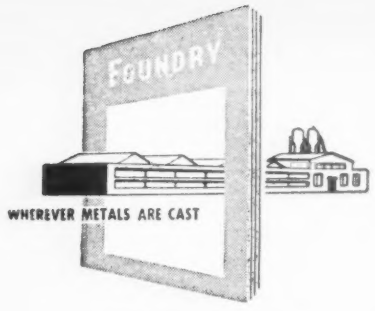
2—Fin Cleaning Machines for cleaning cylinder heads
1—3 H.P. double stand grinder—flat belt drive 220/440/-3/60
1—10 H.P. double stand grinder — direct connected 220/440/3/60
3—7½ H.P. double stand grinders—direct connected 220/440/3/60

Misc. Foundry Equipment

1—Pug Mill—Link Belt 42" x 96"
1—Atlas Car & Mfg. Co. Car Scale
2—Charging Cranes for cupolas, Shepard 3 ton cap. D.C. Cab operated. Complete with monorail.
1—30 ton Bridge Morgan overhead crane DC. 15 ton main hoist, 5 ton aux. hoist, 54' 6" span
1—5 ton Overhead crane Cab operated DC. 57' span
Pouring ladles whiting and Modern 900 lbs. capacity.
1—4' x 10' Robbins Shake-out with 7½ H.P. motor 220/440/3/60.
1—4' x 6' Simplicity Shake-out, Model D, 1600# cap. 10 H.P. 220/3/60.
1—500# Hausfeld hand tilt furnace
3—Stationary Sand Slingers—Beardsley-Piper 16" head
2—#3 Jeffrey Vibrators
4—#4 Jeffrey Vibrators
1—50 H.P. Spencer Turbine Cupola Blower 16 oz. 220/440/3/60.
1—20 H.P. North American Turbine Blower 24 oz. 220/440/3/60.
2—3 H.P. Blowers for furnaces 16 oz. 220/440/3/60.
1—Pig Mold Conveyor (Link-Belt) 74' lg. complete with drive for aluminum and magnesium.
2—1000 Gals. p. min. Centrifugal Pumps, Ingersoll-Rand, 52 ft. head, 5" suction, 4" discharge, dir. connected to 20 H.P. 220/440/3/60, Rebuilt.
Various sizes steel flasks, Hines Popoff flasks and jackets.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

15019 Saranac Rd., Cleveland 10, Ohio **Telephone—GLenville 1-1538**



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Dear Reader:

Elsewhere in this issue, you have read a splendid report on foundry industry progress. For those of us who owe our livelihood to the metal castings industry, the forward march of the foundry industry inspires respect and appreciation.

Some of us remember well when total production was less than one-third of what it is today, most of us have seen a doubling of castings production—and all of us have seen great progress of the industry, technically. We should be prideful that each of us, in his own way, has contributed something to this progress.

We are aware, of course, that the long range outlook indicates further substantial increase in demand for castings. In another generation, it is anticipated that 27,000,000 tons will be minimum normal castings production (last year's production was 16,500,000 tons). By 1960, production of 21,000,000 net tons is foreseen.

—o—

We have fun: Our sales promotion department has recently come up with an "aptitude test on foundry marketing and merchandising." Although designed primarily for foundry suppliers, it should be of interest to foundrymen as well. If you will write to Jeanne Franklin, Business Department, you will receive a copy of the test which, when executed and returned, will entitle you to a fancy diploma "suitable for framing."

—o—

Ah, youth! Someone told us one time that when policemen start looking younger to you, it's a sure sign you're getting old. They've been looking more youthful every day—especially following our recent return from Washington and New York. Spring vacation isn't what it used to be! Now the boys and girls take off to see the Cherry Blossoms and Washington, if, that is, they haven't signed up for a school trip to New York City, or haven't made plans to head for Miami! We'd like to think and do think it's all part of the progress picture of this generation.

—o—

Suggestion to Management: If your key personnel does not already have access to each issue of FOUNDRY, we suggest that you ask about our plan for group subscriptions. An increasing number of foundries is providing this low-cost service with the very realistic attitude that a well-informed supervisor saves and makes

(*Continued on next* page)

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money for the firm. Why not do this—send us a list of your supervisory personnel? We'll check it against our circulation records and suggest the number of subscriptions you need to benefit fully from FOUNDRY's continuing service to the industry.

—o—

Never Under-estimate: May we introduce three young ladies who serve you well in our New York and Chicago branch offices? Missing are New York's Irene McSweeney and Mary Helen Foster.

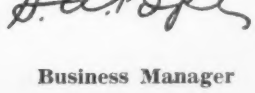
Teresa Kamerman
New York

Aleda C. Hagen
Chicago

Marguerite Griffiths
Chicago

—o—

We are looking forward to seeing many of you in Chicago, at the Foundry Convention, May 4 to 8.



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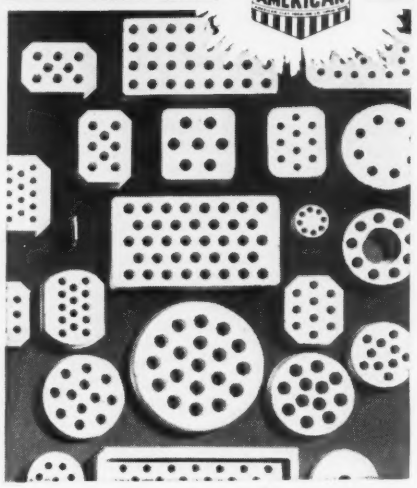

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American will quote prices on any size or shape core . . . so write today for samples and descriptive literature. There's no obligation, of course.

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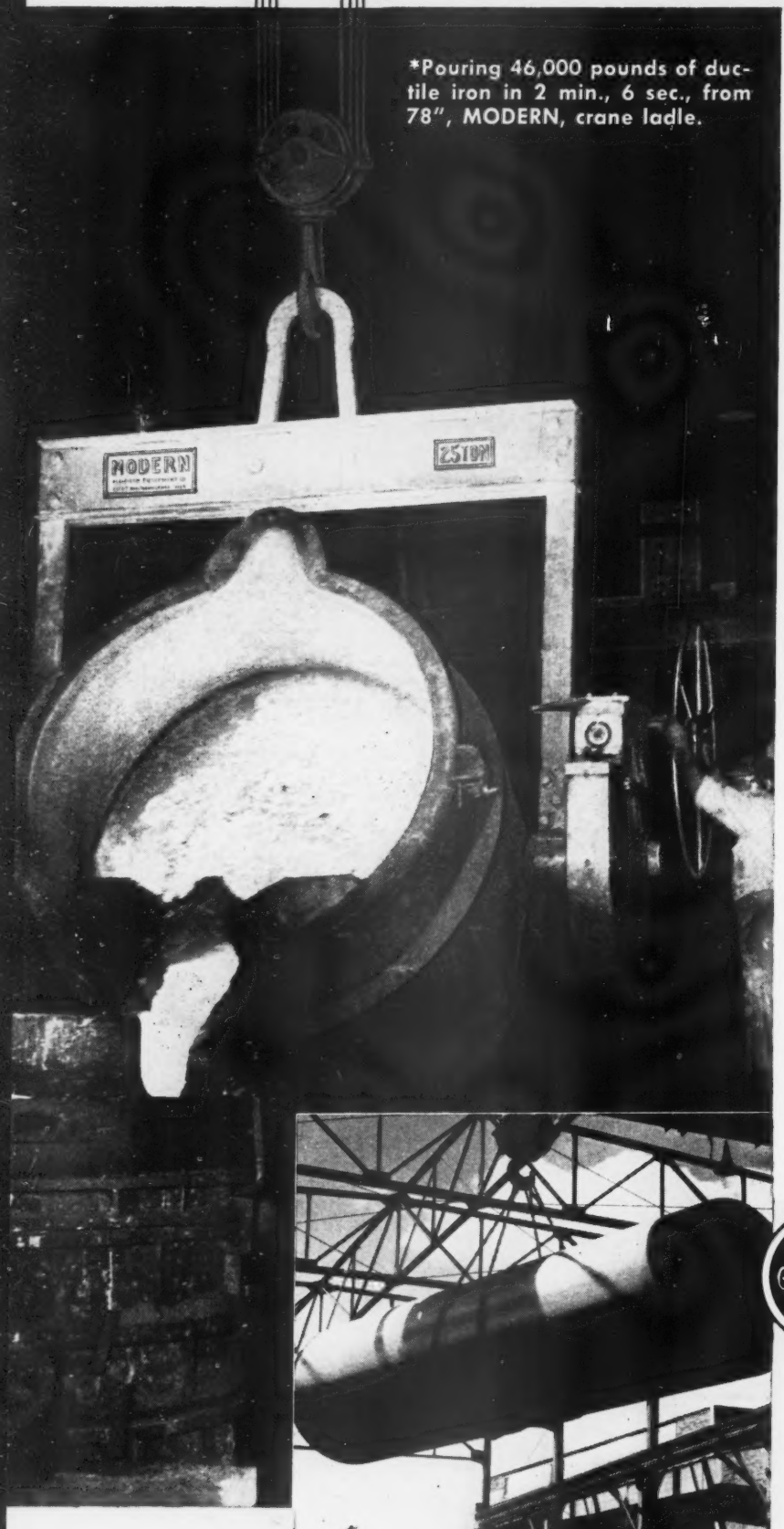

*Pouring 46,000 pounds of ductile iron in 2 min., 6 sec., from 78", MODERN, crane ladle.

1 *UNIFORMITY OF METAL CAST . . .
2 MORE PAY-TIME OVER THE MOLD . . .
3 REDUCED WASTE, LESS PIGGING . . .

Working closely with practical foundrymen, right out on the job for more than thirty years, has qualified MODERN engineers for designing the difficult, made-to-measure jobs.

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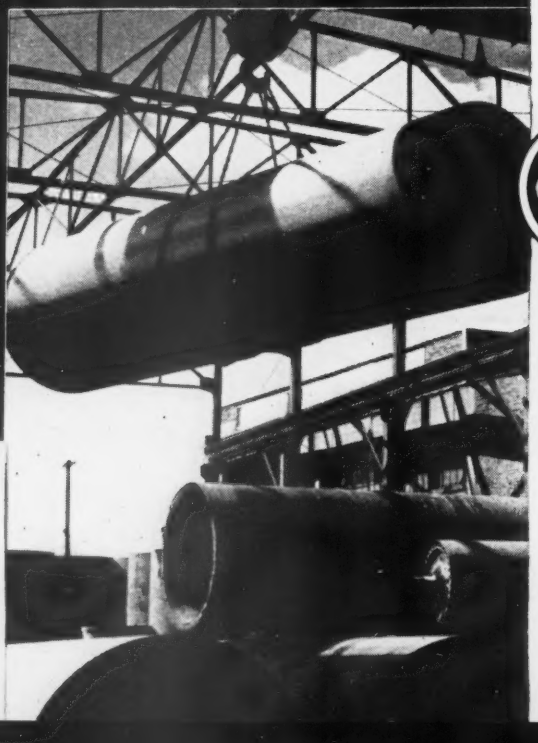

The cast dryer rolls for high production paper making machines are ready for machining after casting at the Beloit Iron Works foundry.

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High heat resistance. Smoother casting surface. Castings clean easier. Easy to apply. Make shakeout faster and easier.

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Have good "green grab"—high tensile strength. Will not boil or swell out of joints. A grade for every purpose.

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Economical—gives 20 to 60 molds per application. Eliminates dust from molding areas. Ideal for patterns for plaster molds—for match plates, loose patterns or core boxes.

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Mix easily with water. Stay in suspension. Adhere firmly. Smooth, uniform coverage. Can be applied by brush, spray or dip. Reduce metal penetration. Easy, clean peel of sand from castings.

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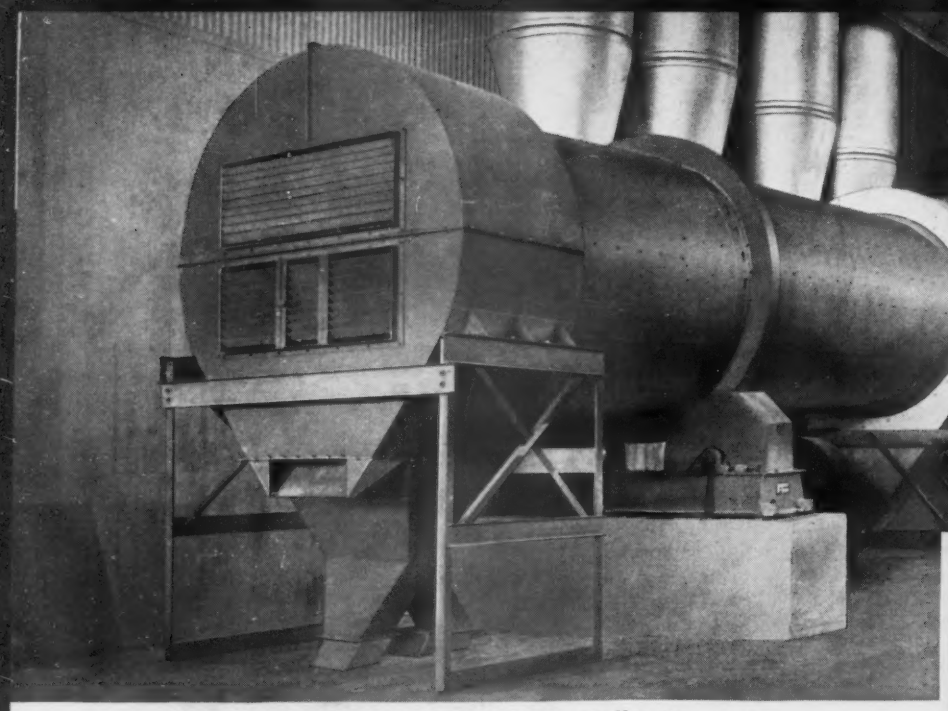
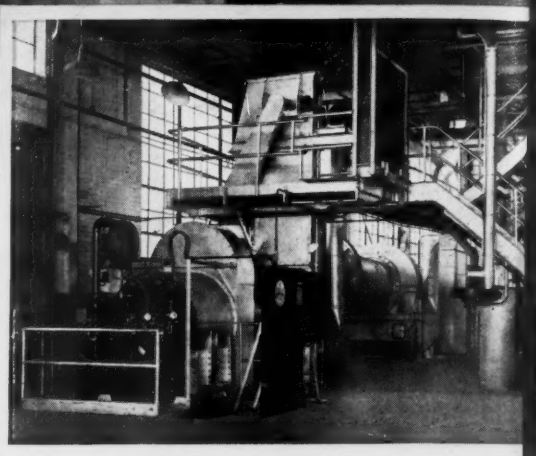
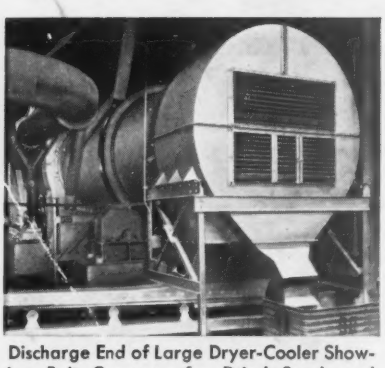




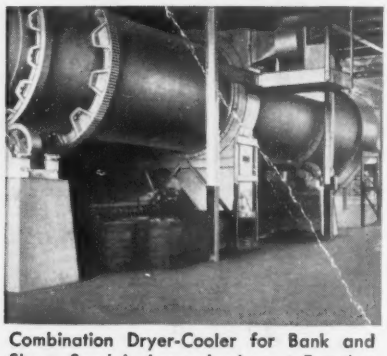
Above: Two Core Sand Rotary Dryer-Coolers 102" in Diameter by 66 Feet Long in Large Automobile Foundry. At the *Right:* Core Sand Dryer-Cooler in Farm Equipment Foundry Showing Furnace Arrangement.

For Your Core Room

combination Dryer-Coolers



Discharge End of Large Dryer-Cooler Showing Belt Conveyor for Dried Sand, and Tailings Chute for Scalpings.



Combination Dryer-Cooler for Bank and Sharp Sand in Large Implement Foundry.

will provide a continuous supply of essentially bone dry sand — within 5° of room temperature "READY TO USE" — regardless of variations in the rate or moisture content of the sand fed

● Assure exact duplication of every core mix — save on binders — get a uniform bake and constant core structure reducing losses of both cores and castings by passing incoming sand through a Bartlett-Snow combination Dryer-Cooler. Gas or oil fired types. Built-in scalping screen removes foreign material. Automatically controlled. Furnished complete with storage and handling equipment. Sizes to meet **your** capacity requirement.

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